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CONTENTS

PAGE

William Pollock Fraser, 1867-1943. By J. H. Craigie 1
Notes from a Labrador Peat Bog. By A. E. Porsild 4
Does *Sphaerium occidentale* Mature in one Season? By H. B. Herrington 6
Nesting of the Barred Owl (*Strix varia*) in Ontario. By A. E. Allin 8
Botanical Field Notes - Summer of 1943. By W. Sherwood Fox 10
Spread of the Smelt (*Osmerus mordax*) in the Canadian waters of the Great Lakes By J. R. Dymond 12
Recent Breeding of the Rough-winged Swallow near Ottawa. By Harrison F. Lewis 15
Early Hooker Plant Ranges Restored. By Herbert Groh 17
The Long-tailed Meadow Mouse (*Microtus longicaudus*) in Canada. By R. M. Anderson and A. L. Rand 19
Statement of Financial Standing, Ottawa Field-Naturalists' Club, December 2, 1943 25
Sixty-fifth Annual Meeting of the Ottawa Field-Naturalists' Club, Report of Council 26
The Role of *Sphaerospongia tessellata* in the Mackenzie River Devonian. By P. S. Warren 28
Notes and Observations 22
Current Literature 18, 29, 30
Book Reviews 27, 30
News of Naturalists 16

The official publications of THE OTTAWA FIELD-NATURALISTS' CLUB have been issued since 1879. The first were *The Transactions of the Ottawa Field-Naturalists' Club*, 1879-1886, two volumes; the next, *The Ottawa Naturalist*, 1886-1919, thirty-two volumes : and these have been continued by *The Canadian Field-Naturalist* to date. *The Canadian Field-Naturalist* is issued bi-monthly. Its scope is the publication of the results of original research in all departments of Natural History.

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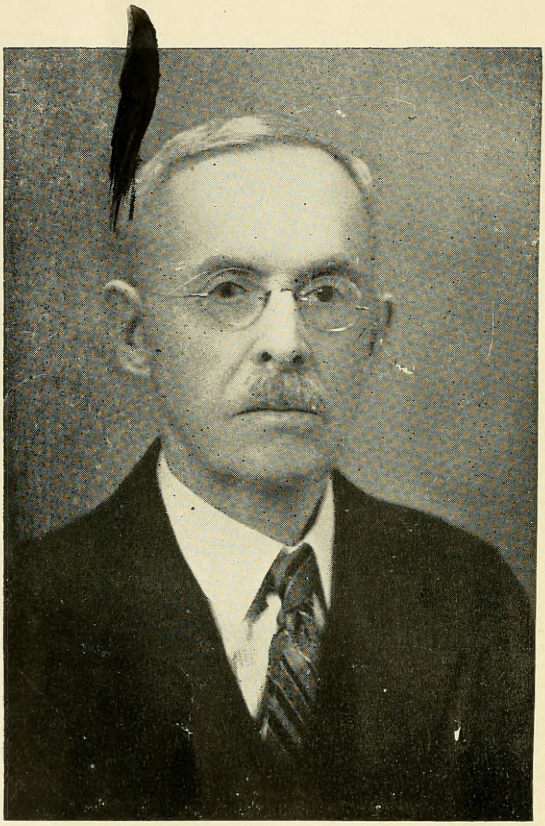

William Pollock Fraser
1867 — 1943

The Canadian Field-Naturalist

VOL. 58 SUTTON WEST, CANADA JANUARY-FEBRUARY, 1944 NO. 1

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WILLIAM POLLOCK FRASER[1]
1867 — 1943

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By J. H. CRAIGIE
Dominion Laboratory of Plant Pathology, Winnipeg, Man.

WILLIAM POLLOCK FRASER, Professor-Emeritus of Biology in the University of Saskatchewan, died at his home in Saskatoon, Sask., on November 23, 1943. For several years he had been afflicted with a heart ailment, which curtailed considerably his activities, but, with the devoted assistance of his wife, he continued his scientific work, at times from a sick bed, until a few days prior to his death. His passing is a pronounced loss to botanical science and to a wide circle of associates, students, and friends who held him in esteem and affection.

Dr. Fraser was the son of Alexander and Anna (Pollock) Fraser, and was born in 1867 at French River, Pictou County, Nova Scotia. When little more than a boy, he was left, through the accidental death of his father, in charge of the home farm. At the age of twenty-one, he entered New Glasgow High, and later attended Pictou Academy and the Provincial Normal School at Truro, and subsequently spent two years at Dalhousie University. As he was obliged to pay his own way, his years of study were interspersed with years of teaching. In 1903, he joined the Staff of Pictou Academy as Instructor in Natural Science, but resigned in 1905 to attend Cornell University, from which he received the A.B. degree in 1906. He continued his studies there, and in the following year, was reappointed to his former position in Pictou Academy. Dalhousie College conferred on him the B.A. degree *ad eundem* in 1907 and the M.A. degree in 1910. In January, 1912, he was appointed to the Staff of Macdonald College as Lecturer in Biology and, in that year, he married Miss Alice Adele McRae. A year or two later, he was promoted to the position of Assistant Professor of Biology.

At the request of the Dominion Department of Agriculture, he spent the summer of 1917 and of 1918 in studying the cereal rust situation in Western Canada, and, in February, 1919, was appointed Officer-in-Charge of the newly established Dominion Laboratory of Plant Pathology at the University of Saskatchewan, Saskatoon. In that year, the University of Saskatchewan granted him the M.A. degree *ad eundem* and appointed him, on a part time basis, as Lecturer in Biology. These appointments he held concurrently until 1925, when he severed his connection with the Department and accepted the position of Professor of Biology in the University. On his retirement in 1937, the University, in recognition of his services, honoured him with the LL.D. degree and appointed him Professor-Emeritus of Biology. From 1925 onward, he was a member of the Associate Committee on Field Crop Diseases of the National Research Council and the Dominion Department of Agriculture. He was a member of the American Phytopathological Society, and a Fellow of the American Association for the Advancement of Science. He was a charter member of the Mycological Society of America, Canadian Society of Technical Agriculturists, and of the Canadian Phytopathological Society. In the latter society, he served as Vice-President from 1929 to 1931 and as President from 1931-1933, and, in 1940, was elected to honorary membership.

In his life as in his work, Dr. Fraser was actuated by a profound loyalty to truth. His manner of life was simple; his relations to others generous and sincere. Though he was

1. —Contribution No. 765 from Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa, Canada.

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modest and retiring, his nobility of character and disciplined mind compelled deference and inspired confidence. Just as in his social relations, he influenced by example rather than by precept, so, in his teaching, he placed the emphasis more on demonstration than on formal lectures. He pursued research without thought of fame or distinction. To his students and associates in research, he was both mentor and friend, and they accorded him a respect little short of reverence. Valuable and extensive as were his direct contributions to botanical science, probably his greatest contribution was indirect, that is to say through his example of complete and disinterested devotion to scientific truth and the inspiration he imparted to his students and associates in research.

Dr. Fraser was a born naturalist. He was familiar with birds and insects, but chose plants as his special field of study. Being an indefatigable collector, he spent most of his spare time in collecting and classifying plants, cryptogams as well as phanerogams, with the object of building up herbaria in the institutions with which he was connected. His interest in plants led him on to a study of diseases affecting them. He was the pioneer in plant rust research in Canada, and, because of his extensive knowledge of the rusts, was appointed to initiate and direct cereal rust investigations in Western Canada, to which investigations he made permanent and fundamental contributions. Although for some years, his work was concerned mainly with plant diseases, he never lost his interest in the native flora, and the later years of his life were largely devoted to a study of it. After his retirement in 1937, he undertook the reorganization of the phanerogamic herbarium of the University of Saskatchewan and a revision of the list of Saskatchewan plants earlier published by him and Dr. R. C. Russell, neither of which tasks he was able quite to complete.

He was author or co-author of the following publications:

Fraser, W. P. 1909. The Erysiphaceae of Pictou County. *Bull. Pictou Acad. Sci. Assoc.* 1: 51-58. The Office of the Pictou Advocate, Pictou, N.S.

..... 1909. Collection of the aecial stage of *Calyptospora columnaris* (Alb. & Schw.) Kühn. *Science* 30: 814-815.

..... 1911. Cultures of some heteroecious rusts. *Mycologia* 3: 67-74.

..... 1912. Cultures of heteroecious rusts. *Mycologia* 4: 175-193.

..... 1913. Further cultures of heteroecious rusts. (Abstract). *Phytopathology* 3: 73.

..... 1913. Further cultures of heteroecious rusts. *Mycologia* 5: 233-239.

..... 1913. The rusts of Nova Scotia. *Trans. Nova Scotia Instit. Sci.* 12: 313-445.

..... 1913. Diseases of forest and shade trees. *Quebec Soc. Protect. Plants Ann. Rept.* 5: 76-84. 1913.

..... 1914. Notes on *Uredinopsis mirabilis* and other rusts. *Mycologia* 6: 25-28.

..... 1914. Notes on some plant diseases of 1913. *Quebec Soc. Protect. Plants Ann. Rept.* 6: 45-50.

..... 1914. Storage rots of potatoes and other vegetables. *Quebec Soc. Protect Plants Ann. Rept.* 6: 50-51.

.....1915. The cereal rusts. *Quebec Soc. Protect. Plants Ann. Rept.* 7: 116-120.

..... 1917. Over-wintering of the apple-scab fungus. *Science* 46: 280-282. (Abstract). *Int. Rev. Sci. & Pract. Agric.* 8: 1161.

..... 1918. The outbreak of wheat rust in 1916. *Monthly Bull. of Agric. Statistics.* 11: 61-67. March.

.....1919. Cultures of heteroecious rusts in 1918. *Mycologia* 11: 129-133.

..... 1920. Methods for controlling smut. *Public Service Monthly* (Sask.) 8: 14. May.

..... 1920. A smut of western rye grass. (Abstract). *Phytopathology* 10: 316.

..... 1920. Cultures of *Puccinia Clematidis* (DC.) Lagerh. and *Puccinia Impatientis* (Schw.) Arth. *Mycologia* 12: 292-295.

..... 1921. Plant disease investigations in Western Canada. *Agric. Gaz. Canada* 8: 318-320.

..... and D. L. Bailey. 1921. Biologic forms of wheat stem rust in Western Canada. (Abstract). *Phytopathology* 11: 202.

..... 1921. Report of the Saskatoon Laboratory of Plant Pathology in co-operation with the University of Saskatchewan, and the Dominion Laboratory at Indian Head, for 1920-21. *In Division of Botany Interim Report for year ending Mar.* 31,1921: 93-107. *Can. Dept. Agr., Ottawa.*

..... 1922. Cultures of heteroecious rusts, 1920-21. *Mycologia* 14: 228-230.

..... 1922. Report of the Dominion Field Laboratory of Plant Pathology, Saskatoon, in co-operation with the University of Saskatchewan, and the Dominion Field Laboratory at Indian Head, for 1921. *In Interim Report of the Dominion Botanist for the year ending Mar.* 31, 1922: 61-72. *Canada Dept. Agr., Ottawa.*

..... 1923. Report of the Dominion Field Laboratory of Plant Pathology at Saskatoon, in co-operation with the University of Saskatchewan, and the Dominion Field Laboratory at Indian Head for 1922. *In Report of the Dominion Botanist for* 1922: 43-63. *Canada Dept. Agr., Ottawa.*

..... and P. M. Simmonds. 1923. Dusting with copper carbonate and other substances for smut control. (Abstract). *Phytopathology* 13: 293.

..... 1923. Co-operative experiments with copper carbonate dust and other substances for smut control. *Sci. Agr.* 3: 297-302.

..... 1924. Seed treatment for smut control. (Abstract). *Phytopathology* 14: 347.

..... 1924. Report of the Dominion Field Laboratory of Plant Pathology in co-operation with the University of Saskatchewan. *In Report of the Dominion Botanist for* 1923: 38-48. *Canada Dept. Agr., Ottawa.*

..... and P. M. Simmonds. 1924. Co-operative experiments with copper carbonate dust and other substances for smut control in 1923. *Sci. Agr.* 4: 257-263.

..... 1924. "Take-all" of wheat in Western Canada. (Abstract). *Phytopathology* 14: 347.

..... 1925. Culture experiments with heteroecious rusts in 1922, 1923 and 1924. *Mycologia* 17: 78-86.

Jackson, V. W., W. P. Fraser and D. L. Bailey. 1925. The present status of the barberry eradication campaign in Western Canada. *Sci. Agr.* 5: 375-378.

Fraser, W. P. 1925. Report of the Dominion Field Laboratory of Plant Pathology, Saskatoon, Sask. *In Report of the Dominion Botanist for* 1924: 65-71. *Canada Dept. Agr., Ottawa.*

..... and I. L. Conners. 1925. The Uredinales of the Prairie Provinces of Western Canada. *Proc. and Trans. Roy. Soc. Canada* III. 19 (Sect. 5): 279-308.

..... P. M. Simmonds, and R. C. Russell. 1926. The take-all disease in Canada. (Abstract). *Phytopathology* 16: 80-81.

..... and G. A. Scott. 1926. Smut of western rye grass. *Phytopathology* 16: 473-477.

Ruttle, Mable A. and W. P. Fraser. 1927. A cytological study of *Puccinia coronata* Cda. on Banner and Cowra 35 oats. (Abstract). *Phytopathology* 17: 748.

..... 1927. A cytological study of *Puccinia coronata* Cda. on Banner and Cowra 35 oats. *Univ. of Cal. Publ. in Bot.* 14: 21-72.

Fraser, W. P. and G. A. Ledingham. 1929. Studies of the sedge rust, *Puccinia Caricis-Shepherdiae. Mycologia* 21: 86-89.

..... 1931. Additions to the Uredinales of the Prairie Provinces of Canada. *Proc. and Trans. Roy. Soc. Canada,* III. 25 (Sect. 5): 85-92.

..... and G. A. Ledingham. 1933. Studies of the crown rust, *Puccinia coronata* Corda. *Sci. Agr.* 13: 313-323.

..... and R. C. Russell. 1937. List of the flowering plants, ferns and fern allies of Saskatchewan. pp. 1-46. University of Saskatchewan, Saskatoon.

..... 1938. Additions to the list of flowering plants of Saskatchewan. 7 pp. University of Saskatchewan, Saskatoon. (mimeographed).

Bisby, G. R., A. H. R. Buller, J. Dearness, W P. Fraser, and R. C. Russell. 1938. The fungi of Manitoba and Saskatchewan. pp. 1-189. National Research Council, Ottawa.

Fraser, W. P. 1940. Notes on the Cyperaceae of Saskatchewan. I. Scirpus. *Can. Field-Naturalist* 54: 100-101.

..... 1942. Notes on the willows of Saskatchewan. *Can. Field-Naturalist* 56: 104-110.

Ledingham, G. F. and W. P. Fraser. 1943. Notes on the Cyperacae of Saskatchewan. II. Carex. *Amer. Midl. Nat.* 29: 42-50.

NOTES FROM A LABRADOR PEAT BOG[1]

By A. E. PORSILD
National Museum of Canada, Ottawa

ON OCTOBER 26, 1943, I had occasion to spend an afternoon in a fine peat bog at Goose Bay, Lake Melville, Labrador (53°20′ N., 60°24′ W.). Following two weeks of freezing weather the deciduous trees were all bare and all summer-green plants were frozen and wilted. The ground was frozen but fortunately not covered by snow.

The bog, which appears to be typical of much of the Lake Melville lowlands, occupies an almost level, sandy plain about 50 feet above the level of the lake. The bog is a typical black spruce bog with spruce 15-25 feet high, scattered balsam fir, white birch, larch, spotted alder and willow. In general aspect, except for one or two plants, notably the baked-apple (*Rubus Chamaemorus*), the bog was astonishingly like some such southern bog as the Mer Bleue of the Ottawa district. In wet places among the trees the ground was covered by sphagnum and hepatics (*Marchantia polymorpha*) with a dense undergrowth of *Chamaedaphne calyculata, Ledum groenlandicum, Alnus incana* and *Salix candida* etc. In somewhat drier places the ground cover was chiefly the lichens *Cladonia rangiferina* and *C. sylvatica* with *Kalmia angustifolia* and *Vaccinium pennsylvanicum* forming the undergrowth. On fallen trees and on stumps were seen species of *Polyporus* and on a birch stump a single specimen of *Fomes* sp.

A deep trench which had been excavated through the bog earlier in the summer revealed that no permanently frozen ground existed, at least to a depth of 15 feet. In one cut the following soil layering was observed:

forest duff and raw humus	15 cm. thick
white leached sand	15 cm. thick
red, rust-coloured sand	30 cm. thick
hard-pan (bog iron)	22 cm. thick
dark grey, not rust coloured sand, at a depth of two meters resting upon blue clay.	100-200 cm.

Since comparatively little is known of the flora of the interior of Labrador, it was considered worth while to record the species of plants that were yet recognizable. In the case of critical or rare plants specimens were preserved and later checked in the National Herbarium, Ottawa. In the following list species that do not appear to have been recorded from the Lake Melville district or from interior Labrador are marked with an asterisk (*); species marked (†) do not appear to have been recorded heretofore from Labrador.

Dryopteris Linnaeana C. Chr. common

Dr. spinulosa (O. F. Müll.) Watt. common in wet places

Lycopodium annotinum L. common

L. obscurum L. rare in dry places

Equisetum arvense L. common

E. sylvaticum L. common

Picea mariana (Mill.) B.S.P. common

Abies balsamea (L.) Mill. common

Larix laricina (DuRoi) Koch common

Agrostis scabra Willd. common in wet places

Calamagrostis Langsdorwi (Michx.) Nutt. common

†*Catabrosa aquatica* (L.) Beauv. in a sluggish stream

Scirpus cespitosus L. common

†*Rynchospora alba* (L.) Vahl. in marshy places

Eriophorum spissum Fernald common

†*E. virginicum* L. in marshy places

**Carex disperma* Dew. common

**C. trisperma* Dew. common

**C. pauciflora* Lightf. in marshy places

**C. exilis* Dew. common

**C. limosa* L. common

C. aquatilis Wahlenb. in a marsh

Luzula parviflora (Ehrh.) Desf. occasional

1.—Received for publication December 13, 1943.

**Juncus albescens* (Lange) Fernald in wet places

Smilacina trifolia (L.) Desf. common

**Salix candida* Willd. common

Betula papyrifera Marsh. common

Alnus incana (L.) Moench common

Stellaria calycantha (Ledeb.) Bong. common

Coptis groenlandica (Oed.) Fernald common

**Drosera rotundifolia* L. in wet places

Sarracenia purpurea L. in wet places

Rubus Chamaemorus L. common

Sorbus decora (Sarg.) Schneid. var. *groenlandica* (Schneid.) Jones occasional

Prunus pennsylvanica L. occasional

Potentilla fruticosa L. common

Amelanchier Bartramiana (Tausch.) Roem. occasional

Epilobium glandulosum Lehm. var. *adenocaulon* (Hausskn.) Fernald common

E. angustifolium L. common

Cornus canadensis L. common

Moneses uniflora (L.) Gray common

Pyrola secunda L. common

Ledum groenlandicum Oed. very common

Kalmia angustifolia L. very common

K. polifolia Wang. common

Chamaedaphne calyculata (L.) Moench common

Chiogenes hispidula (L.) T. & G. common

Vaccinium pennsylvanicum Lam. common

V. Vitis-Idaea L. common

†*Oxycoccus microcarpus* Turcz. in wet sphagnum

Menyanthes trifoliata L. in wet places

†*Veronica serpyllifolia* L. rare in wet places

Viburnum pauciflorum Raf. common

Linnaea borealis L. var. *americana* (Forbes) Rehd. common

Aster foliaceous Lindl. occasional

On low, swampy willow flats bordering the shores of Goose Bay, and subject to spring floods, the following species were observed:

Dryopteris spinulosa (O.F. Müll.) Watt. common

Equisetum arvense L. common

Abies balsamea (L.) Mill. common

Picea mariana (Mill.) B.S.P. common

Cinna latifolia L. common

Calamagrostis Langsdorffii (Michx.) Nutt. common

Carex trisperma Dew. common

Salix candida Willd. common

S. sp. (tree-like) common

Betula papyrifera Marsh. common

Alnus incana (L.) Moench common

Stellaria longifolia Muhl. common

Thalictrum polygamum Muhl. common

Rubus Idaeus L. var. *canadensis* Richards. common

Viola palustris L. common

Epilobium glandulosum Lehm. var. *adenocaulon* (Hausskn.) Fernald common

Cornus stolonifera Michx. common

Trientalis europaea L. var. *arctica* (Fisch.) Ledeb. common

Galium labradoricum Wiegand common

Viburnum pauciflorum Raf. common

In the richer, alluvial soil near the lake shore the trees were larger and better developed than in the bog. The white birch, balsam fir and black spruce here attained an impressive size with trunks 18 inches in diameter. The stumps of some recent cuttings also showed an astonishing rate of growth comparable to that of more southern latitudes. Thus, in one balsam fir measuring 37.5 cm. (15 inches) in diameter two feet above the ground, I counted 90 annual rings. During the

first 54 years the growth had been rather uniform, averaging 6.0 mm. annually; then followed an abrupt change and during the remaining 36 years of growth the annual rings averaged but 1.4 mm.

A nearby black spruce which also measured 37.5 cm. (15 inches) in diameter, during the first 30 years of life had increased at the average rate of 3.0 mm. per year, followed during the next 30 years by an annual growth of 7.0 mm., while during the remaining 20 years, the thickness of the annual rings had decreased to 3.7 mm. per year.

These figures at least show that black spruce and balsam fir in the Lake Melville district have been capable of a remarkably rapid growth during their first 60 years of life, during which both trees attained a diameter of about 12 inches.

The annual rings of a few younger trees, 5-6 inches in diameter, indicated that the growth rate had been somewhat less. Lack of time, unfortunately, did not permit the examination of a larger number of stumps.

Due to the lateness of the season but few birds were observed. I did see two small flocks of pine grosbeaks, a few redpolls and one chickadee. Signs indicated that rabbits and meadow mice were plentiful. A number of red squirrels were seen.

References.

Fernald, M. L. and Sornborger, J. D. Some recent additions to the Labrador Flora, *Ottawa Naturalist*, 13, 4: 89-107 (1899).

Kindle, E. M. Notes on the Forests of Southeastern Labrador. *Geogr. Review*, 12: 57-71 (1922).

Macoun, J. M. List of the plants known to occur on the coast and in the Interior of the Labrador Peninsula. *Geol. Surv. of Canada. Ann. Rep.* 8, part L, App. 6: 353 L - 366 L (1895).

Wetmore, R. H. Plants of Labrador. *Rhodora* 25: 4-12 (1923).

DOES *SPHAERIUM OCCIDENTALE* MATURE IN ONE SEASON?[1]

By H. B. HERRINGTON

Newburgh, Ontario

SOME of the small finger nail clams (family Sphaeriidae) live in temporary waters, i.e. among the leaves and grasses of swamps and pools that dry up in summer. From the time that their habitats dry up until the following spring (or fall rains??) they are in a resting state. Very little is known about their life history. For example, in what stage do they pass the winter? F. C. Baker, in *"The Fresh Water Mollusca of Wisconsin"* (Vol. 11, Page 348), says of *Sphaerium occidentale* Prime, "It would appear that full growth must be attained in one season, as some of the ponds in which they live dry up and the majority of the mussels die. A few old ones probably survive and bear young for the following season." The observations, to follow, bear on this aspect of their life history.[2]

During the latter half of September, 1943 the writer found, in a swamp four miles north-east of Newburgh, Camden Township, Lennox and Addington County, Ontario, a colony of *S. occidentale*. Prime living in a resting state. This colony was visited two or three times. The specimens collected varied in size from 2.2 to 7.6 mm. An inch or two of decaying vegetable matter—sticks and weeds—covered the surface of the ground. Some empty shells were on the surface, but the greater number, including the live specimens, was intermingled with the decaying vegetable matter. Underneath this latter was black muck—dried to a granular form—interwoven with roots. In this no shells were found. The swamp is usually flooded in late fall and so continues until spring.

On opening several large specimens it was found that some were gravid but others, as far as could be detected, were not. The

1 —Received for publication November 15, 1943.

2 —Only specimens that were alive when taken are given consideration in this paper.

number of infants in the gravid specimens ranged from one to six. Such nepionic infants that were secured (I have 20) varied in size from 1.2 to 2 mm. Three specimens half-grown, or less, were opened. None of these appeared to be gravid. Several specimens were placed in water for 24 hours but they showed no signs of arousing from their resting state.

The finding of this colony in such a varied state of development so late in the year led the writer to examine the other lots in his possession—which consist of the series from the collection of the Royal Ontario Museum of Zoology, Toronto, (including the collection of the late Chief Justice Latchford) and those collected by the writer. This called for the opening of a few adults in each lot, that had the date collected indicated, to find if they contained any nepionic infants. The results are listed below along with that of some of the juveniles.

LOCATION (all in Ontario)	Date	Nepionic Infants	Juveniles
Elizabethtown Twp., Leeds Co.	Apr. 14, 1941	1.1 *	2.5; 3; 3.1; 3.7; 3.9; 4.5*
Thomasburg, Hastings Co.,	May 10, 1940	1; 1.8	2; 2.1; 2.2; 2.5; 3
Elizabethtown Twp., Leeds Co.,	May 10, 1941	1.5	2.4; 2.5; 2.8; 3.5; 3.9
King Twp., York Co.	May 18, 1940	2.1	2.7; 3.1; 3.2; 3.5
Thomasburg, Hastings Co.,	May 22, 1940	1	2.1; 2.5; 2.7; 2.9; 3.2; 3.3
Marmora Twp., Hastings Co.,	June 6, 1942	2	
Merrickville, Grenville Co.,	June 10, 1942		2.8
Lorna Park, Carleton Co.,	June 20, 1913		2.2; 2.5; 3; 3.6
Camden Twp., Lennox & Addington,	June 24 1943	1.6	3.3; 3.6; 4.5
Graham Creek, Britannia Heights	July 5, 1913	1.2; 1.6	2.8
Niagara--on-the-Lake, Lincoln Co.,	Aug. 21, 1940	2	2.1; 2.5; 3.1; 3.6
Turkey Pt., Norfolk Co.,	Aug. 26, 1940	1; 2.1	2.1; 2.3; 2.7; 3.3; 3.5
Camden Tp., Lennox & Addington	Sep.17-22, 1943	1.2; 1.7; 1.8; 2	2.2; 3.3; 3.5; 3.7; 3.8

Space permitted a report on the sizes of juveniles only, but in all large lots the range in size continued up through those full-grown. One lot of 44 shells was arranged according to size—from new-born to old age—and they graded evenly from small to large. There were no gaps.

Another feature should be noticed. In all full-grown shells of this species in my possession there is a series of some three, four or five ridges. These may begin slightly beyond the nepionic valve or between it and the middle of the shell, and end with one or two ridges at the outer edge of the shell—these last increasing the diameter more than the height or length of the shell. These ridges give the impression of being rest periods, as the new growth begins from the inner edge of the shell rather than from all across the edge. These ridges also show on the inside of the shell.

With these facts before us some inferences may be drawn. It seems to the writer that:

(1) Since nepionic infants are to be found in various stages of development in these molluscs from April to September (we have no lots earlier than April nor later than September in our collection); and since there is a continuous series, with no break, from birth to old age, the breeding season must extend throughout the whole period of activity, i. e., except when the animal is resting.

(2) Since juveniles of various sizes were in a state of resting in September; and, again, juveniles of similar sizes were living and active at least as early as April, the assumption of Baker that, "full growth must be attained in one season", hardly holds good.

Furthermore, — as mentioned above, — in some shells the rest mark commences immediately after birth, while in others the first mark does not occur until the shell is half-grown; and all intermediate conditions are found between these extremes. These observations also indicate that clams of various sizes in this species winter over.

*All measurements are in millimeters and represent maximum length.

NESTING OF THE BARRED OWL (*STRIX VARIA*) IN ONTARIO[1]

By A. E. ALLIN
Fort William, Ontario

THE BARRED OWL (*Strix varia*) is not widely distributed in Canada. The northern limits of the northern race (*S. v. varia*) includes southern Manitoba, central Ontario ond southern Quebec. (Although the A.O.U. Check-List (1931) includes "Saskatchewan", the writer can find no basis for the statement). There is one record for northern Alberta (Preble, 1941, *Auk*, 508, *pp.* 407, 408).

Nowhere in the province of Ontario is the species found plentifully in summer. However, it is reported in appreciable numbers in southern Ontario during the autumn and winter of certain years. These occasions seem to indicate periodic population peaks and concentration of migrants from areas in the north along the periphery of the Barred Owl's range. For example during the winter of 1939-40 records of twenty-nine individuals were made in the Toronto region according to data on file in the Royal Ontario Museum of Zoology. Further support of the belief that the species was unusually numerous during this period accrued in the form of breeding evidence. On May 27, 1940 a pair of Barred Owls discovered near Maple, Ontario by Mr. R. J. Rutter appeared from their behaviour to be established there for breeding. A young bird in juvenile plumage in the Royal Ontario Museum was secured at Barnesdale, Parry Sound District, on July 2, 1940, by Mrs. C. Proctor. On August 1 of the same year a young bird was observed at Port Carling, Muskoka District by Mr. Frank Banfield.

The general rarity of breeding evidence of the species in the province is indicated by the fact that apparently no set of Barred Owl eggs taken in Ontario exists in any collection. Also, the literature on Ontario birds contains few records of breeding. The following is a digest of the records to date:

Macoun (*Catalogue of Canadian Birds*, Part 2, 1903) states a set of eggs was taken near Chatham, Ontario, April 4, 1897 but this record has not been generally accepted and was omitted from the edition published in 1909. Macoun also quotes C. J. Young as follows, "The nest has been found in a hole in a tree near Kingston, Ontario and a few years ago I saw five young birds that were shot about a mile outside of the town of Brockville, Ontario in July." Baillie and Harrington (*Trans. Roy. Can. Inst.* 1936, Vol. XXI, pt. 2) state that "two adults with one young (down still in evidence) were seen in June, 1933," by Rutter at Katrine, Parry Sound District. L. S. Dear (*Trans. Roy. Can. Inst.* 1940, Vol. XXIII pt. 1) saw a pair near Fort William, in 1927. On one occasion, one of the birds enticed its mate into a hole in a tree. This cavity was empty when examined at a later date. He also records the taking of a young bird and an infertile egg in Oliver Township, May 3, 1940. Since this appears to have been the first egg of the species collected in Ontario, it would seem that more details of the record and the subsequent history of this breeding pair might be of interest.

On June 3, 1939 Dear had seen a pair of Barred Owls at the edge of a large mixed woods, 15 miles west of Fort William, in Oliver Township, District of Thunder Bay. He investigated a large hollow tree but no evidence of nesting was discovered. On June 18, he showed me one of the birds in the same area. The tree was again thumped vigorously with a club but no bird was flushed, probably because it was too late in the year. Realizing the Barred Owl returns year after year to a suitable nesting site we determined to pay particular attention to this area in the spring of 1940. No owls were seen on March 26 but on April 25 a pair was heard and one bird seen. The suspected nesting tree, a slightly inclined Balsam Poplar (*Populus Tacamahaca*) was a mere stub, 30 inches in diameter and 35 feet in height, from the tip of which grew the one remaining live branch. Without irons it was impossible to climb this tree. Vigorously striking the trunk failed to flush a bird. Returning on April 28, repetition of the above again proved fruitless but when a pole was pushed up and down within the hollow base

1. —Received for publication November 1, 1943.

a Barred Owl flushed from a large cavity near the top of the tree. On May 5 we returned with climbing tackle and the bird was again flushed by the above method. The cavity at the top of the tree contained the addled egg reported by Dear, and now in his collection and a downy young still bearing the egg-tooth which is in the collection of the Royal Ontario Museum of Zoology. The egg measured 49.5 by 41.0 millimetres. The adult bird sat in a nearby tree while the egg and young were procured. When the tree was climbed again on May 16 one of the birds clung to my coat and buffetted me heavily with its wings. No eggs were present. On June 13 the area was again visited, the birds were still present, but the nesting tree had blown down.

The area was visited frequently in 1941 but we were unable to find a nesting site although the birds were heard by Dear on June 6.

In 1942, no birds were seen in the area but on April 6, a Balsam Poplar which appeared to be a logical nesting site was located 100 yards from the tree which had blown down in 1940. This tree, 2 feet in diameter and 30 feet tall was little better than a dead stub. Several large holes were seen near its tip. Revisited on April 17, a Barred Owl was flushed from the hollow top by rubbing a branch up and down the trunk of the tree after striking the bole had failed to flush the bird. The effect was probably the same as would be produced by a large animal climbing the tree. We returned on April 20 and the process was repeated. This time the tree was climbed and the nesting site was found at the bottom of a cavity extending down 5 feet from the top of the stub. Another large opening to the outside was present several inches above the bottom of this cavity. There we collected two well incubated eggs which measured 51.0 x 42.5 and 49.0 x 42.0 millimetres. This is apparently the first set of eggs of the Barred Owl to have been collected in Ontario. They are now in the writer's possession. On May 18, Dear and I returned and collected a second set of eggs from the same site. One was well incubated but the second was addled. They are in Dear's collection.

The spring of 1943 was very late. We visited the area on April 11 and saw one bird about 75 feet from the tree where they had nested in 1942. On this occasion the nest cavity contained one egg. A few owl feathers were noted about the cavity. On April 18, at which time there was still two and one-half feet of snow in the bush and the trees were white with a 2 inch snow-fall of the previous day, for the first time the bird was flushed by striking on the trunk of the tree. The nest contained three eggs and a small handful of owl feathers. These eggs are now in the writer's collection. They measured 52.0 x 43.0, 51.0 x 42.5 and 50.0 x 43.0 millimeters. One contained an embryo, 1 centimetre in length. The others were fresh, probably infertile as no germinal spot was noted when they were blown. On May 12, the area was again visited and a Barred Owl noted about 100 feet from the nest, which contained two eggs measuring 51.0 x 42.5 and 50.0 x 42.5 millimetres. Incubation was advanced about 5 days. They are now in the collection of Dr. Paul Harrington, Toronto. At the time of this visit a dead Red-backed Vole (*Clethrionomys gapperi gapperi*) was found at the bottom of the nesting tree. This was the only occasion on which food was found in the area. No pellets have been noted.

SUMMARY

The nesting site of a pair of Barred Owls (*Strix varia*) was located 15 miles west of Fort William, District of Thunder Bay, Ontario.

These birds have returned to the same area for five successive years since they were first noted. On several occasions the incubating bird could only be flushed from the nest by rubbing the trunk of the tree with a long pole.

On one occasion an Owl attacked the climber when the nesting site was approached.

In 1942, and again in 1943, after the first set was collected, a second clutch was laid in the same nesting cavity.

Four sets of eggs, as well as an addled egg and a downy young have been taken, and are now in collections.

BOTANICAL FIELD NOTES — SUMMER OF 1943[1]

By W. SHERWOOD FOX
University of Western Ontario, London, Ontario

1. *Asclepias Sullivantii* Engelm.

At the joint request of the Division of Applied Biology of the National Research Council of Canada, and of the Division of Botany and Plant Pathology, Department of Agriculture, Central Experimental Farm, Ottawa, I undertook in the summer of 1943 to find on Walpole Island, Lambton County, Ontario, specimens of *Asclepias Sullivantii* Engelm. This species was last reported there by C. K. Dodge in 1894, that is, practically half a century ago. This station is the only one recorded for the plant in Canada. The fact, demonstrated in certain western laboratories in the United States, that *A. Sullivantii* holds a high rubber content made it most desirable for Canadian laboratories which are investigating North American milkweeds as a possible source of rubber, to acquire some specimens of this particular species. Obviously, native Canadian specimens, already fully acclimated, were to be preferred to specimens imported from Iowa and Nebraska, even if the latter could be procured.

On July 20 last I visited Walpole Island, which has long been an Indian Reserve, in the company of Mr. E. H. McKone, now Principal of the Normal School, Peterborough, Ontario. Under the guidance of a resident Indian, Silas Sands, (who has by the way, an uncanny knowledge of the Island's flora) we found three stations of *A. Sullivantii*. Unfortunately, none of these was large; nevertheless, we managed to secure several specimens, in prime bloom, for the herbarium of the University of Western Ontario and for herbaria in Ottawa; also a number of live plants with roots. All three stations are situated in the northwestern corner of the Island. The exceptionally high waters of the St. Clair and Snye Rivers and in the inland swamps made the investigation of the remainder of the area.....perhaps three-quarters of it in all..... quite impossible on this visit. Since the Island is about twelve miles by six the proportion yet to be searched is extensive.

Upon returning to the mainland on July 21 we were fortunate to chance upon two adjacent stations of *Sullivantii* lying close to the Sarnia-Wallaceburg highway. These, we could not but note, were situated on a line projected exactly north-east of the two larger stations found the day before on the Island. Manifestly, the plants growing here were the product of seed born by the prevailing south-west summer wind. This afforded a clue to future search.

Because of the need of additional live rooted specimens for the Experimental Farm Mr. McKone, accompanied by Mr. W. G. Colgrove of the University of Western Ontario, returned to Walpole Island in the middle of August. Their mission was successful.

The collection of ripe pods of *Sullivantii* was the next desideratum. These were required both for the study of their floss and for trials in propagation at the Farm. On October 5th Professor Duncan McLarty, of the University's Department of Botany, and the writer, endeavored to return to the Island. Unfortunately, since the Indians were not operating the ferry, the tourist season being past, we had to limit our collecting to the mainland stations discovered on the first visit. Here we gathered a couple of dozen pods. At this point we recalled the geographical relation of these stations to those on the Island. Retreating northwards on the shore road to a point exactly north-east of the most northerly station on the Island and across the Snye River (the Chenail Ecarté) we came, according to calculation, upon another station considerably larger than the other two stations taken together. This yielded a number of large pods of a bright green color. Those secured from the other mainland colonies were distinctly reddish, indeed, of a shade often seen in the red strain of *A. syriaca*. This seems to present a nice problem: have we here, as in *A. syriaca*, a phenomenon ecological or genotypic in character? One has yet to ascertain if the reddish varieties of both milkweeds differ in rubber content from the green.....perhaps an important question. One observation was noted, be it worth what it may: on October 5

1. —Received for publication October 16, 1943.

all the plants of *Sullivantii* had entirely lost their leaves, whereas the *syriaca* still retained most of theirs. Of the pods collected on that day all, except a few kept for our own laboratories, were forwarded to Ottawa.

2. *Liatris spicata* (L.) Willd.

Liatris spicata has been reported as existing only in three places in Canada: Sandwich, Sarnia and Walpole Island. In recent years Professor L. O. Gaiser of McMaster University has recorded it as growing in abundance in the last mentioned locality. In July 1943 the present writer observed it there in a station of *Asclepias Sullivantii*. On the following October 5th he found again on the mainland a colony of *A. Sullivantii* which had evidently sprung up from seeds carried from the Island by the south-west wind. Presumably, the *Liatris spicata* growing there had been borne in the same manner. This new mainland station of the species may be recorded as three miles south of Port Lambton.

3. *Celtis occidentalis* L.

On July 10, 1943 I found a very large and healthy Hackberry tree (also called the Sugarberry) growing near the south bank of the Maitland River, Huron County, Ontario, at Ben Miller, five miles south-east of Goderich. This is situated fifty-five miles north of London. This observation conspicuously extends the recorded northern range of the Hackberry. The most northerly specimen of the species hitherto noted by the writer personally is situated at Blair, Waterloo County, Ontario, two miles from Preston. There is an unconfirmed report of a tree at Conestoga, fifteen miles north of Blair, also on the Grand River.

4. *Platanus occidentalis* L.

In my boyhood I often saw a specimen of the Plane Tree (also known as Sycamore and Buttonwood) which then stood at Taylor's Mills on the Don River, in the north-east part of Toronto. For many years I regarded this as the most northerly appearance of this Carolinian tree in North America. Twenty years ago I found a number of specimens in Huron County growing beside the Exeter-Grand Bend highway where it crosses the Aux Sables River. This point is on about the same line of latitude as Toronto, perhaps ten or twelve miles south of it. Knowing that it is the habit of the tree to follow rivers, I have yearly been expecting to come across examples of it farther north in southwestern Ontario. In August 1943 my expectations were fulfilled. At Forrester's Bridge on the Maitland River, five miles north-east of Clinton and ten miles from Goderich, I found over a dozen specimens. These stood close to the edge of the low-lying north bank of the River, some of them small and a few large, but all badly mutilated by ice. The next day at Piper's Dam, on the south-east corner of Goderich itself, I came across a single specimen of about the size of a mature apple-tree. Both this and the trees at Forrester's Bridge are considerably north of the tree at Toronto.

NOTICE

Beginning with Volume 58 *The Canadian Field-Naturalist* will be published in six bi-monthly numbers. There will be no reduction in the total number of pages per volume but rather it is expected that the increased number of pages published in volume 57 will be continued and extended. It is hoped that very shortly publication will be up to date and that future numbers will be issued on time at regular intervals.

The new arrangement will permit the publishing of somewhat longer papers within single numbers. The Editor will welcome manuscripts reporting original studies in any field of Natural History. Brief notes and observations, short statements concerning current literature of interest to our readers, reviews of books on Natural History, and brief news items respecting members of the Ottawa Field-Naturalists' Club or others actively engaged in any phase of Natural History will also be welcomed. — HAROLD A. SENN, EDITOR.

SPREAD OF THE SMELT (*Osmerus mordax*) IN THE CANADIAN WATERS OF THE GREAT LAKES[1]

By J. R. DYMOND
Royal Ontario Museum of Zoology, Toronto

DURING the past ten years the spread of the introduced smelt (*Osmerus mordax*) in the Great Lakes has attracted considerable attention. Some account of its history in these waters has been published by Van Oosten (1937a) but it seems desirable to record more detailed information on the spread of the species in Canadian waters.

The information here recorded concerns the period up to and including the spring of 1942. For much of this information I am indebted to several correspondents of the Royal Ontario Museum of Zoology.

The native home of the smelt now found in the Great Lakes is the Atlantic coast region of America where it lives in the sea, running into streams in spring to spawn. Some lakes in Maine and New Brunswick contain smelts all the year round and it was probably from one of these fresh water lakes (Green Lake, Maine) that the species was introduced into the Great Lakes.

The smelt first gained access to the upper Great Lakes through plantings by the state of Michigan. Many papers recording the early history of the smelt in the Great Lakes have appeared. These have been summarized and much additional information recorded by Van Oosten (1937a). As early as 1906 smelts were planted in the St. Mary's river from the Sault Ste. Marie (Michigan) hatchery. Plantings were made at the same place at intervals up to 1921 but it is doubtful if any of these plantings were successful. In 1912 several million smelt eggs were planted in Crystal Lake, Michigan, but mature smelts were not noticed in this lake until 1918. In 1923 they appeared in Lake Michigan near the outlet of Crystal Lake. The first records for Lake Huron came in 1925 when smelts were reported off Rogers city, Michigan, in northern Lake Huron. In 1932 many were taken in herring nets at the south end of Lake Huron.

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Lake Huron

So far as records are concerned, the first smelts appeared in the Canadian waters of Lake Huron in 1931, when specimens were taken in fishermen's nets off Tobermory and in Georgian Bay (Van Oosten, 1937a).

Savage (1934) recorded the first runs into streams of the north shore of Lake Huron as occurring in 1932. They were first noticed on April 8th, 1932, when they ascended the Algoma and Shepherd Creeks. "The fish were densely crowded in the streams and people living in the vicinity captured large quantities with the aid of improvised dip nets." Their abundance suggests that they had probably appeared a year or two earlier.

In 1932 they also appeared in Dean's Bay Creek and Lonely Bay Creek on the south shore of Manitoulin Island. In 1933 they were noticed in McBeth Creek at Nestorville, Thessalon River, Livingston Creek, Slip at Blind River, Mississagi River, Lauzon Creek, Serpent River at Spragge, Stoby Creek at Portlock, (Savage, 1934). The same year they ran for the first time in Gore Bay Creek on the north shore of Manitoulin Island.

By 1934 spawning had spread to streams on St. Joseph's Island, the Kagawong River, north shore of Manitoulin Island and to Hog River, Victoria Harbour (Fred Storms, Victoria Harbour). This is the earliest record for spawning in streams tributary to Georgian bay. Additional reports were not received until 1936 when runs occurred in the Magnetawan River, to Sucker Creek, Sturgeon Bay and to many small streams in the vicinity of Pointe au Baril. The next year they were reported as plentiful in Sucker Creek and runs were beginning in the Spanish River and in a small stream near Port Severn. In 1938 Mr. Wallace R. Nesbit reported smelts taken for the first time in the vicinity of Wah-Wah-Taysee near Midland. The same year saw runs in the North River near Coldwater, in Sturgeon River, Shawanaga River and Seguin River (Parry Sound).

By 1941 there was said to be not a stream large or small along the entire Georgian Bay that smelts did not visit at spawning time and they were running in most of the streams on the Lake Huron shore proper, including Maitland River, Nine-mile Creek at Port Albert and in most streams from Port Elgin to Port Albert.

Lake Superior

Although the smelt is now widely distributed in Lake Superior, it is not known how or when it gained entrance. Van Oosten (1937) says "In 1930 it was first reported in Whitefish bay at the eastern end of the lake. In 1934 a specimen was taken off Marquette, Michigan, and in 1936 in Keweenaw Bay..... It is believed that the smelt reached Lake Superior through the St. Mary's River rather than from the inland lakes of the Huron Mt. region, although it is perhaps possible for the species to reach Lake Superior from these inland lakes".

Along the north channel of Lake Huron, the smelts appeared, according to Savage (1934) "in the more easterly streams and in subsequent years farther west". Beginning in 1933 or 1934, they gradually worked their way up the St. Mary's River. According to R. H. Burns of Sault Ste. Marie "above the St. Mary's Rapids here in the city the smelt was not noticed until about 1937 or 1938." About the same time (1938 or 1939) commercial fishermen found smelts in the stomachs of lake trout taken on various shoals off the mouth of Batchawana Bay, Lake Superior. In 1939 they appeared in some creeks in the same region. In Palmer's Creek, Goulais Bay, their first appearance was in 1940. During the summer of 1940 dead smelts were washed up on the beach of Batchawana Bay. In the spring of 1940 a fisherman brought in to Rossport the first smelt he had taken. The first record in Thunder Bay was in the fall of 1940 and in the spring of 1941 they ran for the first time in the Current River and Vicars Creek, Port Arthur. In 1941 runs were reported in all small streams between Sault Ste. Marie and Cape Gargantua; as far as Corbeil Point they were reported as "very plentiful".

Lake Erie

By 1932 the smelt had reached Lake St. Clair but it was not reported for Lake Erie until 1935, when Mr. Carl F. Kolbe of Port Dover, Ontario, reported that "the odd smelt was taken here in 1935 and this summer (1936) each boat has been reporting from one to six fish daily". (Van Oosten 1937a, 1937b).

By 1940 they were still not commonly taken in gill nets nor in pound nets, one per 50 gill nets and one per pound-net being the average reported. On April 28, 1940, a few were reported in a drainage ditch 13 miles west of Blenheim. H. C. White saw smelts in Silver Creek four miles east of Port Bruce in the spring of 1942 and noticed eggs which he believed to be smelt eggs attached to rocks.

Lake Ontario

A single specimen was taken in the nets of Wm. F. Depew on Sept. 9, 1931, about two miles off Bowmanville. So far as Mr. Depew knew, smelts had never previously been taken in that locality. Several more were taken during the next summer (Mason, 1933).

These specimens taken near Bowmanville in 1931 and 1932 may not have owed their origin to migration from the upper lakes.

In the spring of 1939, smelts appeared below the dam in the Gananoque River (Toner, 1940).

On April 21, 1942, W. H. Lunn wrote that smelts had ascended the Napanee River for 3 years. They had also entered the Trent River in 1942.

The first smelts were taken in fishermen's nets in the western end of Lake Ontario in the fall of 1940.

DATES OF RUNNING INTO STREAMS

The date smelts run into the streams naturally varies from year to year and from place to place, depending probably on temperature. Following are dates reported for different years and localities.

North shore, Lake Huron

Thessalon River and Nestorville Creek	April 17-30, 1941
Lake Lauzon Creek	April 11-29, 1941
Kagawong River	April 7-?, 1941

Georgian Bay

Hog River, Sturgeon River, Coldwater River	April 18-?, 1941
Near Pointe au Baril	April 16, 1941
Owen Sound area	April 7-?, 1941

Lake Superior

Goulais Bay

Palmer's Creek	April 18-May 3, 1941
Kelly's Creek	April 18-May 3, 1941
Stokely Creek	April 16-May 3, 1941

USES

Considerable quantities of smelts have been caught in spring when they ran into streams at spawning time. They were used in several ways, as human food either fresh or after freezing or canning, as food for pigs, poultry, mink or foxes and as fertilizer. In some areas large quantities were placed in cold storage for feeding mink and foxes on fur farms.

Dip nets of various size were the usual means by which the fish were caught. Quantities taken per individual varied from a few basketfuls to sufficient to fill steel-bodied gravel dump trucks. Mr. R. H. Burns says he has seen such trucks filled in half an hour. He has seen from two to four tons taken from the Nestorville Creek in three hours' time on more than one occasion.

In places smelt fishing took on something in the nature of a community outing. Sometimes hundreds of people gathered at a favourable fishing spot, some of them coming as far as 25 miles.

Few actual measurements are available as to the size attained by smelts in the Great Lakes. Most of those caught in the streams were said to have been between 5½ and 8 inches. Nine inches was a fairly common size, occasional 10 inch specimens were taken. Mr. R. H. Burns reports the largest seen by him in streams of the north shore of Lake Huron was 11½ inches. Wm. Murdock of Algoma Mills in the same area reports one 14½ inch specimen. The usual estimate of average length in Lake Huron was 5½ to 7 inches, in Lake Superior 5 to 6½. These, however, are merely estimates and may not indicate an actual difference in average size between the two lakes.

Smelts are commonly eaten by lake trout. A fisherman in Black Bay, Lake Superior, reported as many as 11 in one stomach.

Smelts were introduced into Michigan to serve as food for land-locked salmon, which it was expected would thrive in lakes once smelts had become established.

A biological study of the smelt in Green Bay, Lake Michigan (Schneberger 1937), indicated that they feed on much the same food as lake herrings and whitefish, although they also eat small fish. Smelt are eaten in large numbers by lake trout and to a lesser extent by perch and ling. Smelt are said to make excellent bait for lake trout. In Green Bay the smelt spawn at the end of their second year of life when they are 6½ to 8½ inches in length.

In Green Bay the smelt are reported to be a serious problem to the commercial fishermen since they get tangled in their gill nets to such an extent that the net will catch only a few, if any, of the more desirable species.

Only time will tell whether the appearance of smelts in such numbers in the Great Lakes is beneficial or otherwise; in any case, it is too late to do anything about it now. The time to consider such problems is before introducing a foreign species.

LITERATURE CITED

Mason, E. J. R. 1933. Smelts in Lake Ontario. *Copeia*, 1933, No. 1 p. 34.

Savage, James. 1934. Smelts in the Canadian waters of Lake Huron. *Copeia*, 1934, No. 4, p. 194.

Schneberger, Edward. 1937. The biological and economic importance of the smelt in Green Bay. *Trans Amer. Fish Soc.* 66: 139-142.

Toner, G. C. 1940. The smelt in upper St. Lawrence waters. *Can. Field-Nat.*, 54: 59.

Van Oosten, John. 1937a. The dispersal of smelt, *Osmerus mordax* (Mitchill) in the Great Lakes region. *Trans. Amer. Fish Soc.* 66: 160-171.

Van Oosten, John. 1937b. First records of the smelt, *Osmerus mordax*, in Lake Erie. *Copeia*, 1937, No. 1, p. 64.

RECENT BREEDING OF THE ROUGH-WINGED SWALLOW NEAR OTTAWA[1]

By HARRISON F. LEWIS
Ottawa

THE BREEDING OF the Rough-winged Swallow (*Stelgidopteryx ruficollis serripennis*) in the vicinity of Ottawa was first recorded by Clyde L. Patch (1), who, on June 28, 1917, found two occupied nest-burrows of this species in a sand-bank beside the Rideau River above Hog's Back. On June 5, 1918, he collected a nest with six eggs of this species in the same vicinity (2). These records are suitably mentioned by Lloyd in "The Birds of Ottawa, 1923" (3).

In November, 1938, I recorded (4) observations, on May 10 and 11, 1938, of two Rough-winged Swallows on the southwestern outskirts of Ottawa, where a freight line of the Canadian Pacific Railway crosses the Rideau Canal close to the entry of the canal into Dow's Lake, and remarked that there did not appear to be any published record of the occurrence of this species in the Ottawa district in the interval since 1918.

On May 19, 1940, I saw a Rough-winged Swallow with one or two straws in its mouth as it flew over the Rideau Canal near the same railway bridge. On the same day I saw a pair of this species investigating a hole in an earth bank on the north side of the Rideau River a short distance below White's Bridge.

On the following day, May 20, 1940, I observed a pair of these Swallows near the railway bridge over the Rideau Canal where it enters Dow's Lake and saw one of them enter and leave a drainage pipe in the vertical cement wall of the canal.

On April 20, 1941, I saw a pair of Rough-winged Swallows examining the entrances to drainage pipes in the canal wall in the same area.

On April 26, 1942, three Rough-winged Swallows were seen at Dow's Lake and one at Billing's Bridge, on the Rideau River. On June 7, 1942, four of these Swallows were seen along that part of the Rideau Canal extending from Hartwell's Locks to Hog's Back and one was seen flying over the neighbouring part of the Rideau River.

On June 21, 1942, I saw, beside the Rideau Canal between Dow's Lake and Hartwell's Locks, a family of young Rough-winged Swallows recently out of the nest. These young birds sat on telegraph wires and begged. While I watched, an adult Rough-winged Swallow flew toward them, a young bird flew from the wire to meet it, and the adult fed the young while they both fluttered in the air.

A few minutes later, after walking past Hartwell's Locks, I saw four adult Rough-winged Swallows flying over the Rideau Canal between those locks and Hog's Back. They were entering and leaving the open ends of drainage pipes in the vertical cement wall of the canal. At each of two of these openings three visits by an adult swallow were made in the course of ten minutes. On one occasion at each of these openings, the departing swallow, after flying a few feet away, dropped a small object into the canal. In one of these instances the object was seen in the bird's bill before it was dropped and was seen to be white. I concluded that these birds were feeding young in nests in the drainage pipes and were carrying away the faecal sacs of the young.

At the drainage pipe that I watched most closely the adult Rough-winged Swallow each time came out of the opening tail first. The end of the pipe was flush with the cement wall, with no lip or platform, and the surface of the water was only about four inches below the lower side of the opening, yet the swallow, without pause or apparent difficulty, backed out of the hole into the air and turned about and flew away without touching the water. Once only, after issuing thus from an opening, did one of the Rough-winged Swallows direct its flight near me, as I sat on the retaining wall a few feet away, and utter a single note of irritation before resuming its search for flying insects.

The drain-pipes in the cement retaining wall of the Rideau Canal in and near the City of

1. —Received for publication December 3, 1943.

Ottawa extend through the wall to gravel fill behind, a distance of at least 18 inches. Some of the pipes are two and one-half inches in diameter; others have a diameter of three inches. In the section of the canal between Hartwell's Locks and Hog's Back, a distance of approximately six thousand feet, with a wall only on one side of the canal, there are some sixty of these pipes, set one hundred feet apart, with their outlets about four inches above the normal level of the surface of the water. In some other parts of the canal wall, drainage pipes are fifty feet apart and in some cases their outlets are below the normal level of the surface of the water. Water percolating through gravel fill behind the wall drains into the canal through these pipes, but evidently does not prevent the Rough-winged Swallows from nesting in the accessible ones.

In May, 1943, because the Rideau Canal below Hartwell's Locks was drained during most of the month, thus exposing an unusual number of drainage outlets in the canal walls within the City of Ottawa, Rough-winged Swallows were attracted into the city along the canal as far as Bank Street or farther. Twelve individuals were counted along the canal below Hog's Back on May 23, 1943.

It seems evident that several pairs of Rough-winged Swallows now nest regularly in drainage pipes along the Rideau Canal and Dow's Lake. Probably some also nest about the bridge over the Rideau River at Billings Bridge and in other suitable locations in the Ottawa district.

LITERATURE CITED

1. Patch, Clyde L. The Rough-winged Swallow near Ottawa. Ottawa Naturalist, 31: 46. June and July, 1917.
2. ———— Another Record of the Rough-winged Swallow near Ottawa, Ont. Ottawa Naturalist, 32: 77. Oct., 1918.
3. Lloyd, Hoyes The Birds of Ottawa, 1923. Can. Field-Naturalist, 38:12. Jan., 1924.
4. Lewis, Harrison F. Rough-winged Swallows at Ottawa. Can. Field-Naturalist, 52: 123. Nov., 1938.

NEWS OF NATURALISTS

Mr. A. E. Porsild, Botanist of the National Museum, who has been acting as Canadian Consul to Greenland, returned to Ottawa in November and is back in the Museum.

Dr. C. H. D. Clarke of the National Parks Bureau and Dr. A. L. Rand of the National Museum, conducted wild life studies on the Alaska Highway during the past summer.

Dr. Hugh M. Raup of the Arnold Arboretum, Harvard University, made extensive collections of plants along the Alaska Highway in continuation of his intensive work on the flora of northwestern Canada.

Dr. Ian McT. Cowan, of the University of British Columbia, conducted field work in Banff, Jasper and Kootenay National Parks for the National Parks Branch.

Mr. Herbert Groh and Mr. W. G. Dore conducted an intensive survey of native stands of common milkweed in Ontario and Quebec, during the summer of 1943, as part of the program of research of the Division of Botany, Science Service, Dept. of Agriculture, on supplementary sources of natural rubber. Subsequently Mr. Dore returned to his post in the Dept. of Biology, Dalhousie University, Halifax, N.S.

Dr. Donald C. G. MacKay, formerly Associate Professor of Zoology, University of Connecticut, Storrs, Conn. has recently been appointed Assistant Director of the International Pacific Salmon Fisheries Commission, Dominion Bldg., New Westminster, B.C.

Dr. Harold B. Hitchcock, formerly Assistant Professor of Zoology, University of Western Ontario, London, Ont., has accepted a position on the staff of Middlebury College, Middlebury, Vermont.

EARLY HOOKER PLANT RANGES RESTORED[1, 2]

By HERBERT GROH

Division of Botany, Department of Agriculture, Ottawa

WHEN JOHN MACOUN in 1883 launched Part I of his *Catalogue of Canadian Plants* he remarked in his preface, regarding Sir William Jackson Hooker's *Flora Boreali-Americana* and the three parts of Torrey and Gray's *Flora of North America*, that "The four works above enumerated contain all we know of Canadian botany, beyond the lists which have appeared occasionally in Canadian scientific publications". These and his examination of available herbaria, as well as his own extensive field work, were his sources largely. Obviously early records in the absence of evidence could not be and were not always accepted by the writers of the current manuals, but this does not amount to proof that they were erroneous. Rediscovery of range for such plants is a possibility always before later explorers.

Cyperus strigosus L.

In Part IV, page 94, of the *Catalogue*, Macoun adopts from Hooker for this species a northwestward range from "Upper Canada to the Saskatchewan". This seems to have been disregarded totally in the manuals; and lists, such as that of Fraser and Russell for Saskatchewan, have failed to cite specimens. About the only other species to occur in that part of Canada is *C. Schweinitzii* Torr., which would be little likely to be confused with *C. strigosus*. In view of the foregoing, two specimens in the herbarium of the Division of Botany assume a significance not suspected when they were collected and filed away.

These specimens are:

MANITOBA: Wawanesa, June 9, 1932, *Groh*. SASKATCHEWAN: Manitou Beach, Watrous, June 22, 1932, *Groh*.

The nearest record found is one from Big Island point, Lake of the Woods, Ont., furnished by Conway MacMillan in *Minnesota Botanical Studies* 1: 964, 1897. The ranges given are usually from Maine to Minnesota southward and westward; and on the Pacific Coast. Canadian records are mostly from western Quebec and across southern Ontario. The plant was reported from New Brunswick in the *Proceedings of the Miramichi Natural History Association* in 1905.

Calla palustris L.

The distribution of this plant given in the manuals generally, and in Deam's recent *Flora of Indiana* particularly is: "N.S. to Hudson Bay and Minn., southw. to N.J., Pa., Wisc., and Iowa; also in Eurasia"—this all notwithstanding that Hooker gave a range from "Canada to the Saskatchewan and Hudson Bay." (Macoun). This also omits another notice appearing in Henry's *Flora of Southern British Columbia* from "Hazelton, the only B.C. station, far west of its range. (T. Wilson)". This record was accepted, together with a range to northern Saskatchewan and sporadically in Alberta, in one paper seen. (Dudley, Margaret G., Morphological and Cytological Studies of *Calla palustris*. *Bot. Gaz.* 98: 556-571. 1937).

Specimens in the Division (DAO) and in the National Herbarium (Can), supporting such wider range are:

ONTARIO: Ingolf, 1939, *Denike 656* (DAO): (and numerous eastward). MANITOBA: Muskeg Creek, Lake Winnipeg, 1884, *J. M. Macoun* (Can); Sewell, 1896, *Macoun* (Can); Delta, 1940, *Denike 1334* (DAO). SASKATCHEWAN: Bjorkdale (Fraser and Russell evidently had a specimen at Saskatoon); Lake Waskesiu (in the herbarium at Dominion Experimental Station, Swift Current). ALBERTA: Beaver Hills along the line of the G. T. P. Railway, 1906, *Macoun & Herriott* (Can); shore of Lily Lake, 22 miles N.W. of Fort Saskatchewan, 1939, *Turner 1556* (DAO); near Cooking Lake, vicinity of Edmonton, 1917, *McCalla 2650* (Can); W. of Edmonton, June 11, 1898, *Spreadborough* (Can); Jasper Park, 1919, *J. M. Macoun 414* (Can). BRITISH COLUMBIA: Reid Lake, 20 miles N. of Prince George, Aug. 16, 1939, *Groh 611* (DAO); (observed also E. and W. of Endako, midway between Prince George and Hazelton).

1. —Contribution No. 759 from the Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa, Canada.

2. —Received for publication December 23, 1943.

These citations seem to mark fairly clearly a southwestward limit of range. Northwestwardly a range has been given by Harshberger (1918) in *Phytogeographic Survey of North America*, from the Hudson Bay-Keewatin District to the Mackenzie District at Great Slave Lake; and more recent botanical exploration has extended this to Mackenzie River and its delta, and Alaska. (Porsild, A. E. Contributions to a Flora of Alaska. *Rhodora* 41: 141-301. 1939; also Materials for a Flora of the Continental Northwest Territories of Canada. *Sargentia* 4: 1-79. 1943).

Specimens may be cited as follows (all Can.):

ATHABASKA-GREAT SLAVE LAKE REGION: Delta of the Athabaska River (Mamawi Creek), 1930, *Raup 1994;* Lake Athabaska, Shelter Point, 1932, *Raup & Abbe 4419*; S. shore Lake Athabaska, 5 miles E. of Poplar Point, 1935, *Raup 6674*; E. end Lake Athabaska, 1935, *Campbell*; Murdock Creek district, upper Slave River lowland, 1928, *Raup 1993;* S. W. and N. shores of Great Slave Lake, 1916, *Howe.* MACKENZIE BASIN: Lake near Sans Sault Rapids, 65° 40' N., Sept. 20, 1928, *Porsild 3400*; Creek above Setidgi Lake, plants with mature fruit, Aug. 24, 1927 *Porsild 3175;* between delta and Eskimo Lakes, fragments from muskrat "push-up", Nov. 2, 1933, *Porsild 6933;* between Campbell and Setidgi Lakes, about 68°N., 133°W., Mackenzie delta, rhizomes with young leaves, June, 1927, *Porsild 2023.* YUKON TERRITORY: Mayo district, Stewart River flat 4 miles above Nogold, 1940, *Bostock 155.* ALASKA: Fairbanks, Smith Lake near College (noted) *Porsild;* Fort Gibbon, Yukon River, *Heidman 73.*

Of interest also is the occurence of *Calla palustris* across the Behring Sea in Kamtchatka. (Hultén, E. *Flora of Kamtchatka and the Adjacent Islands.* 1927). The plant is here represented as "? Eurasiatic, transgressing into eastern America.....from Saskatchewan eastwards to Hudson Bay and Nova Scotia, southwards to Minnesota, Michigan, Virginia and New York." Since 1927 the puzzling gap between Kamtchatka and Saskatchewan has been well bridged.

CURRENT LITERATURE

SOME ASPECTS OF CANADIAN BIRDS. *By A. L. Rand. Special Contribution — 43 - 3 — National Museum of Canada, mimeographed,* 11 pp., *Ottawa,* 1943.

In this paper the author first discusses the birds of Canada in relation to the birds of the world. There are about 500 kinds of birds in Canada. He then examines the problem of numbers of birds in Canada and their distribution in the several life zones which he describes. There are sections on the feeding habits of birds, their seasonal movements, nesting habits, nests, night time habits, old age and death. The section telling "Why birds do what they do" will prove of special interest to the student. The paper concludes with a statement on the economic value of birds, a table of extreme age records for a number of species, and a selected list of reference books. — HOYES LLOYD.

AN ANALYSIS OF MINK PREDATION UPON MUSKRATS IN NORTH CENTRAL UNITED STATES, *by Paul L. Errington, Research Bull. 320, Agri. Exp. Station, Iowa State College of Agri. and Mech. Arts, pp. 798-924, 1943.*

Mink sometimes kill numbers of muskrats. As many as thirteen freshly killed muskrats have been taken from a mink cache. (Jeager, 1943, *Jour. Mammal.*, 24, p. 100). Both mammals are important fur bearers. Errington, from many years study in South Dakota and Iowa, has presented many aspects of the mink-muskrat relationship, and their relationship to their environment. He concludes that the many muskrats killed by mink tend to be those that would perish in any case from other causes; that in areas where muskrats are trapped in fall and winter, little benefit would accrue from mink control; where trapping is done in early spring, mink control by midwinter might increase the spring muskrat take in some cases. However the relationship is complex and mink control is usually of dubious value. — A. L. RAND.

THE LONG-TAILED MEADOW MOUSE (Microtus longicaudus) IN CANADA[1, 2]

By R. M. ANDERSON *and* A. L. RAND
National Museum of Canada

BAILEY (1900, *No. Amer. Fauna*, No. 17, pp. 48-50) listed two species of this group in Canada *M. mordax* and *M. macrurus*. Swarth (1933, *Proc. Biol. Soc. Wash.*, 46, pp. 207-211) suggested that there might be a close relationship between *macrurus* and *tetramerus* of Vancouver Island, but we have already shown (1943, *Can. Field-Nat.* 57, pp. 73-74) that this is not the case and *tetramerus* is really a race of *townsendi*. Racey and Cowan (1936, *Prov. of B. C., Report of the Prov. Mus. for 1935*, p. 26) showed that *macrurus* and *mordax* intergrade in southern British Columbia. Goldman (1938, *Journ. Mammal.*, 19, pp. 491, 492) has brought together the forms that are best grouped in the species *longicaudus*, including *mordax* and *macrurus*. It is a western species, ranging from the southwestern United States through Alberta and British Columbia to Yukon and Alaska.

The species in Canada is characterized by its medium size, relatively long tail, rather sparse, harsh fur, lack of well-developed hip glands, rather flat skull with medium-sized bullae, wide incisive foramina and the second upper molar lacking a posterior loop. Though this species has no well-developed hip glands, occasional specimens of old males show glands of some size.

Of other Canadian forms it most closely approaches *M. townsendi* in the subspecies *M. l. macrurus*; this last differs from *townsendi* in the longer tail, lack of well-developed hip glands, wider incisive foramina, larger, more rounded bullae, and lack of a tendency toward an interior posterior point on the second upper molar.

In color the race *M. l. macrurus* is paler, and slightly greyer than the races *M. t. townsendi*, and *M. t. tetramerus*, and greyer, less brownish than *M. t. laingi* Anderson and Rand (1943).

Hitherto two subspecies have been recognized as occurring in Canada: *mordax* over most of the Rocky Mountains west to the eastern side of the Cascades; and *macrurus* of the British Columbia coast.

Study of the material in the National Museum of Canada indicates that another form is recognizable from northern and eastern British Columbia, and the possibility of another form in southeastern Alberta. A discussion of these forms follows.

We are indebted to the Washington State Museum, Seattle, through the kindness of Mrs. Martha R. Flahaut, the United States Fish and Wildlife Service through the kindness of Dr. H. H. T. Jackson and the American Museum of Natural History, through the kindness of Mr. G. G. Goodwin, for loan of pertinent material. A total of 379 specimens were examined in the present study.

Microtus longicaudus macrurus Merriam

Microtus macrurus Merriam, 1898, *Proc. Acad. Nat. Sci., Phil.*, p. 353, -Lake Cushman, Olympic Mountains, Washington.

This is a large, brownish-black, dark- coloured form.

Measurements. — Horseshoe Lake to Loughborough Inlet; 5 males, total length 191-202 mm. (av. 197.6); tail 70-81 (av. 77.0); hind foot 21.5-23.5 (av. 22.7); skull, basal length 25.5-26.5 (av. 26.1); zygomatic breadth 15-16 (av. 15.2); Dean Channel and King Island, average 5 males; 211; 81.4; 23.4; 27.1; 16; Hagensborg, average 4 males, 199; 73.8; 23.2; 26.1; 15.6; Mt. Brilliant, 5000 + ft., average 5 males, 184.6; 66.2; 21.8; 25.6; 14.9.

Range. — Olympic Mountains, Washington, and along the British Columbia coast from the Fraser River to at least Dean Channel: inland to Alta Lake and Hagensborg, Stuie and Mt. Brilliant, Rainbow Mountains.

Remarks. — There is little variation in our material from along the coast. The three specimens from Washington (Clallam and Pierce Counties) without skulls, are indistinguishable from our British Columbia material. Racey and Cowan (1936, *Report of the Provincial Museum, British Columbia, for*

1. —Published by authority of the Director, Mines and Geology Branch, Department of Mines and Resources, Ottawa.

2. —Received for publication January 27, 1944.

1935, p. 26) show that going inland from the coast in the southern part of the range this form intergrades with *mordax* but that specimens from Alta Lake are *macrurus*. Specimens from the mountains above Hagensborg are intermediate between coastal *macrurus* and the interior form in size, but are like *macrurus* in colour and are best referred to that form. *Macrurus* appears to increase slightly in size with increase in latitude, but decreases in size with altitude.

Material examined[3]. — BRITISH COLUMBIA: Brackendale, 1; Upper Pitt River, 1; Horseshoe Lake, 10; Powell River, 6; Bute Inlet, 3; Loughborough Inlet, 9; Stuart Island, 12; Kingcome Inlet, 2; Rivers Inlet, 15; Hot Springs, Dean Channel, 14; Kimsquit, 2; Port John, King Island, 9; Hagensborg, 24; Stuie, 454 ft., 1; Stuie, Caribou Mts., 4700 ft., 2; Stuie, Caribou Mts., 6500 ft., 5; Mt. Brilliant, Rainbow Mts., 16. WASHINGTON:[4] Clallam Co., Slip Point, 1; Pierce Co., Paradise Park, 2. Total 135 specimens.

Microtus longicaudus mordax (Merriam)

Arvicola (*Mynomes*) *mordax* Merriam 1891, *No. Amer. Fauna No.* 5, p. 61—Sawtooth (or Alturas) Lake, east foot Sawtooth Mts., Idaho.

Diagnosis. — Smaller than *macrurus*, considerably paler and with a yellowish to rusty tinge to the upperparts.

Measurements. — (ten adult males from the Osoyoos-Princeton area), total length 171-191 (av. 178.3 mm.); tail 59-70 (av. 64.7); hind foot, 19-21.5 (av. 20.1); skull, basal length, 24-25.75 (av. 24.8); zygomatic breadth 14-15.75 (av. 14.7); (three males, type locality) t.l. 180, 180, 167; t. 67, 63, 57; h.f. 23, 22, 21; skull, b.l. 24.5, 25.2, 25.5; z.b. 14.25, 15, 15.1; (three adult females, type locality) t.l. 174, 180, 181; t. 62, 62, 64; h.f. 21, 22, 22.5; skull, b.l. 25, 25.2; z.b. 14.2, 14.75, 14.75.

Range. — Extending north from Washington and Idaho into the dry interior belt of southern British Columbia, and intergrading with the next form in the vicinity of Rossland, B.C. and Waterton Lakes Park, Alberta.

Remarks — A large series from Osoyoos, Osoyoos-Bridesville Summit, Fairview-Keremeos Summit, Keremeos, Westbridge and Oliver agree well in color with six topotypical *mordax*, though averaging perhaps slightly paler and more buffy grey. There is no difference in the skulls. Specimens from near Princeton, Cascade and Hedley are slightly darker, as are the McGillivray Creek specimens, but from the rusty tinge to the upperparts are referable to this form. One specimen from Chilliwack and one of the Cultus Lake specimens (the other is immature) are considerably darker, but browner and smaller than *macrurus* and are tentatively referred here; specimens from Midway are approaching the next form.

Specimens examined. — BRITISH COLUMBIA: Cascade, 3; Midway, 8; Westbridge, 6; Osoyoos, 7; Osoyoos-Bridesville Summit, 17; Oliver, 4; Keremeos, 11; Fairview-Keremeos Summit, 28; Stevenson Creek, Princeton, 7; Stirling Creek, Hedley, 5; Chilliwack, 1; Cultus Lake, 2; McGillivray Creek, 4; Spence's Bridge, 1. IDAHO[5]: Sawtooth Lake, 3; Sawtooth, 3; Lost River Mts., 2; Dickey, 1; Featherville, 1; Kooskia, 1; American Falls, 1; Blue Spring Hills, 1; Mullan, 1. Total, 118 specimens.

Microtus longicaudus vellerosus Allen

Microtus vellerosus Allen, 1899, *Bull. Amer. Mus. Nat. Hist.*, 12, p. 7 - Liard River, Northwest Territories.

Diagnosis. — Differs from *mordax* in largely lacking the buff and rusty tones and being duller, darker grey-brown above. Differs from *macrurus* in being smaller in size, and slightly paler and greyer in colour.

Microtus longicaudus vellerosus — *Measurements*[6]. —

	No. of specimens	Sex	Total length	Tail	Hind foot	Skull Basal length	Skull zygomatic breadth
Atlin	2	♂	170, 189	63, 74	20, 21	24, 25.5	14, 14.5
	1	♀	182	67	21	25	14
Nahanni Gate and Glacier Lake, Mack. District	5	♂	175-180 av. 176	50-60 av. 54	21-22 av. 21.6	24.5-26.3 av. 25.6	14.75-15.5 av. 15.3
Yahk, New Gate area, B. C.	6	♂	172-195 av. 184	61-71 av.66.3	19.5-21.5 av. 20.3	23.5-25 av. 24.5	14.25-15.5 av. 14.7

3. —Material in National Museum of Canada unless otherwise indicated.

4. —Washington State Museum.

5. —All Idaho specimens, U.S. Fish and Wildlife Service Collection.

6. —in millimeters.

Range. — Southern Yukon and adjacent Alaska, southwestern Mackenzie, and southward over British Columbia (excluding the coastal mountains and the dry belt) and the mountains of Alberta to Yahk and Banff, intergrading with *mordax* in the vicinity of Rossland, B.C., and Waterton Lakes Park, Alta.

Remarks. — In 1899 Allen described *Microtus vellerosus* from the Liard River, N.W.T. (*Bull. Amer. Mus. Nat. Hist.*, 12, p. 7, and *Microtus cautus* from Hell's Gate, Liard River (*l.c.*). In 1903 Allen listed *vellerosus* as a race of *mordax*, and relegated *cautus* to synonymy (*Bull. Amer. Mus. Nat. Hist.*, 19, pp. 548-549). In 1900, in reviewing the genus *Microtus*, Bailey examined the types on which both of these names were founded and concluded that they were inseparable from topotypical *mordax*.

However our material (see below) shows that this area is inhabited by a form separable from *mordax*, and the name *vellerosus* is available.

All the material included in this form is not uniform; the northern animals are greyer, the Chitina Glacier, Alaska specimen is still greyer than Atlin and Teslin Lake specimens. Most of the population from the southern part of the area are darker and browner. However it seems inadvisable to separate them, and together they stand out from the paler, more buff and reddish-tinged specimens from the Okanagan Valley area. Yahk specimens are uniformly dark brown, rather different from Osoyoos specimens. The Rossland and Waterton Lake Park specimens are more reddish-brown tinged, an approach to *mordax*, but are best referred to *vellerosus*.

From the northern edge of the Sweet Grass Hills near the southeastern boundary of Alberta we have one very large specimen with a heavy, spreading skull (measurements, t.l. 213; t. 76; h.f. 22; b.l. 26.5; z.b. 16.25), and with a pale, buffy gray coat. A second skull from the same locality, without skin, is somewhat larger, but badly broken. This suggests that a different, larger and paler form inhabits this area, but more material is needed.

Osgood (1900, *No. Amer. Fauna*, No. 19, p. 35) recorded specimens of this species at Bennett, Lake Marsh, Lake Labarge, Rink Rapids and near Charlie Village that probably belong to this form. The Charlie Village and Circle (1900, Bailey, *No. Amer. Fauna*, *No.* 17, p. 50) records are the most northerly for the species. The specimens collected by Mr. G. G. Goodwin of the Harry Snyder Expedition of 1937 on the Nahanni River and Glacier Lake and here reported on for the first time represent the most northeastern record for the species.

Specimens examined. — 126.

ALASKA: Chitina Glacier, 1; ALBERTA: Banff, 11; Burmis, 3; Crowsnest Pass, 4; Jasper Park, 10; Miette River, 1; Moose Mountain, 2; Mountain Park, 3; Sweet Grass Hills, 2; Waterton Lakes Park, 17. BRITISH COLUMBIA: Atlin, 6; Crowsnest Pass, 2; Fernie, 1; Goatfell, 2; Morrissey, 3; Newgate, 5; Pend d'Oreille, 1; Rossland, 16; Summit Lake, 104 miles northwest of Fort Nelson, 7; Tuchodi Lake, 1[7]; Yahk, 13. NORTHWEST TERRITORIES: Mackenzie District, Nahanni Gates, 3[7]; Nahanni River, 1[7]; Glacier Lake (upper Nahanni River), 3[7]. YUKON TERRITORY: Teslin Lake, 8.

Microtus longicaudus littoralis Swarth

Microtus mordax littoralis Swarth, 1933, *Proc. Biol. Soc. Washington*, vol. 46, pp. 207-212. Shakan, Prince of Wales Island, Alaska.

Range. — Mainland coast and most of the islands of southeastern Alaska. On the coast from Yakutat south at least to Bradford Canal. On most of the islands of the Alexander Archipelago that lie east of Chatham Strait and to the southward.

In the northwest coast region *M. l. vellerosus* intergrades with the reddish-brown *littoralis* Swarth in the valley of the Stikine River (See Swarth, *Ibid.*, 57; 207; and *Univ. of Calif. Publ. Zool.*, 24, 175-178.).

7. —American Mus. Nat. Hist. coll.

NOTES AND OBSERVATIONS

MILKWEED EXTREMES[1] — During surveys in 1943 common milkweed (*Asclepias syriaca* L.) was twice found measuring 6 feet or more in height. At Preston, Ont., on Aug. 6, slightly the tallest of several stalks growing at the edge of a thicket on the slopes to a sluggish stream proved to be 6′ 6″ in height. It bore 40 leaves of moderate size, including 3 on a small axillary shoot and 2 others making up whorls from the prevailing pairs to a node. Pairs already lost from lower nodes would bring the full complement to 51. The 40 leaves, stripped some hours later, weighed a quarter pound. There were also 8 developing follicles and 5 peduncles without follicles.

Another stalk, not so accurately measured, but between 6′ and 6½′ in height, was growing through a pile of posts at Blackwater, Ont. The upper exposed half, which alone bore anything, carried a dense congestion of 66 leaves and about 20 flower clusters. Owing to delayed emergence through several feet of extra cover no pods were yet formed at this date, Aug. 12.

At Smith's Falls, Ont., a clone of milkweed 3′ high on June 25 consisted of 21 strong stalks all with developing flower heads, and all emerging from within a diameter of less than a foot. This is in sharp contrast with other clones which may extend by creeping roots to infest many square rods, either alone or intermingled with others. A nearby infestation of a highway embankment, about 40′ by 8′ in extent and probably one clone, consisted of about 285 stalks. Another roadside stand near Cornwall, 30′ by 6′, contained over 200 stalks or at the rate of close to 50,000 to an acre. One of the most vigorous stands of milkweed seen anywhere was growing on a mucky part of a large infested field west of Lake Chemung in Peterborough County.

Milkweed leaves vary greatly in size and in shape. Occasionally leaves were found up to 12″ in length, mostly blade. Leaf surfaces varied from 6½″ by 2″ in one case to 6″ by 4″ in another. In some examples the shape is approximately oval, in others with a distinct taper toward the tip. Any distinctive leaf character can usually be used to trace the extent of a clone. On a few occasions, (Carleton Place, Ont., Renfrew county, and Thurso, Que.), albino flowers gave an efficient demarcation of clones. Along a mile of the railway at Thurso several clones were thus found associated with others of normal colour. Stem colour in clones likewise falls into two categories, green and dull purple.—H. GROH, DIVISION OF BOTANY, SCIENCE SERVICE, DEPARTMENT OF AGRICULTURE, OTTAWA.

1. —Contribution No. 758 from the Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa, Canada.

COYPU AT CRESCENT, B.C. — During the fall of 1943 a Coypu (*Myocastor coypus*) took up its residence at the mouth of the Nicomeki River. Mr. Spinning of Crescent fed it regularly at his float and it became extremely tame. The animal became a point of real interest for the people living in the vicinity. It would take carrots from the hand. Whether this South American rodent was a stray from some fur farm or whether it had wandered up from Washington where some of these animals are now established in a wild state we do not know.

Unfortunately on December 26th an irresponsible hunter from the city shot the coypu in front of Mr. Spinning's house much to the anger and sorrow of all concerned.

Mr. Kenneth Racey tells me one of these animals was killed in Burnaby a year or two back. — M. W. HOLDOM, CRESCENT, B.C.

(In *The Murrelet*, 28:1, *pp.* 3-9, January-April 1943, "Feral Coypus in the Pacific Northwest", by Earl J. Larrison, a map is given showing in the states of Washington and Oregon seven localities where coypu are kept in captivity and seven localities where they have been taken in a feral state. Oregon official states that "We do not feel that they are desirable animals to have in this State and would be glad to get rid of them." The fur is not of high value and in the Puget Sound region the animal does damage along the river valleys by foraging in vegetable gardens. Larrison states: "A careful evaluation should be made of the status of these animals while there is yet time to control them, should such action be necessary. — Associate Editor, Mammalogy.)

UNIQUE MARKER FOUND ON WILD GOOSE — Attached to the leg of a wild Goose that was shot during the fall of 1942 near Port Harrison, Quebec, was found a shield-shaped copper medallion or watch-fob engraved with a crown, a wreath, the letter "C" and two chevrons, all in military design. It is not an official emblem, however, and evidently was manufactured for private sale by the Billings Manufacturing Company, Toronto, Ontario. Presumably the chevrons indicate two years service, probably during the 1914-1918 conflict.

This is one of the most interesting of the many curiosities that have been found attached to wild birds and reported to the National Parks Bureau of the Department of Mines and Resources, Ottawa, which has custody of the official Canadian Bird-Banding Records.

Official bands have been placed on thousands of native wild birds of many species, and any person who finds a banded bird can help advance scientific knowledge of wild birds by reporting the details to the Controller of the National Parks Bureau. — T. S. HENNESSY, OTTAWA.

RUDDY TURNSTONE AT OTTAWA IN 1943—During most of May, 1943, Dow's Lake and the lower section of the Rideau Canal were drained, a condition unusual at that season. On May 23, 1943, I had an excellent and entirely satisfactory observation of a Ruddy Turnstone (*Arenaria interpres morinella*) on a mud-flat beside the railway bridge over the canal close to where it enters Dow's Lake. The bird was seen both on the ground and in flight and its conspicuous and characteristic markings were clearly observed. I have had extensive field experience with this species on the shores of the Gulf of St. Lawrence.

Hoyes Lloyd, in "The Birds of Ottawa, 1923", *Can. Field-Nat.*, 37: 151. 1923), placed this species in the hypothetical category and remarked, "There are no records of its occurrence in the district, so far as I am aware." — HARRISON F. LEWIS, OTTAWA.

BASILARCHIA astyanax-arthemis Comstock IN THE TORONTO REGION. — During the past summer (1943) butterfly collectors in the Toronto Region have noticed that *Basilarchia arthemis*, well known as the banded purple, was largely replaced by the hybrid form *astyanax-arthemis*, the hybrid purple, referred to by J. H. Comstock in his *"Study of Insects"*, 1895, page 407. The large numbers seen and captured by the few collectors at present in the field seems to dispose of the idea of an aberrant form.

Unable to get far afield, the writer noted seven hybrids and two normal specimens on blossoms in his garden not too far from the centre of the city.

Mr. Donald Baker collected fifteen hybrids in a short time at Sherwood Park just outside the city of Toronto, and reported it as more numerous than the normal type. Mr. C. E. Hope of the Royal Ontario Museum of Zoology, reported that the hybrid type was to be seen freely at many places in the Toronto district and, he thought, in excess of the normal type.

Mr. Sprague Troyer, residing just outside the city, reports that both forms came so freely to spoiled fruit in his garden that it was not necessary to go farther. He captured a big series of both types and submitted a considerable number for our inspection, assisting greatly in the determination of the hybrid type.

The writer would welcome notes from collectors who have observed this departure from normal in *B. arthemis*, and the Museum, short of collectors owing to the war, would like to obtain, for record, any specimens of the hybrid form that our readers can spare.
— CHARLES E. CORFE, ROYAL ONTARIO MUSEUM, TORONTO.

CHIMNEY SWIFTS GATHERING TWIGS. —At Nipawin, Sask., the swifts arrived a little later than usual this spring, the first pair being noted on June 7th; on the 8th two pair were racing back and forth over town all day. The weather turned colder and the birds were not noted again until June 12th, when one pair showed up, and were seen investigating chimneys in the business block.

On June 26th I saw a pair circling around several small dead poplars, apparently gathering twigs. On June 27th I hid in the thick undergrowth beneath these dead trees, and was fortunate enough to see the manner in which these twigs were gathered. First the birds flew at half speed approaching the trees, then with but a momentary wavering about the tops, passed on and circled several times in the vicinity. This was repeated about a dozen times. Finally both birds came sailing in on set wings, a little lower than the topmost branches. When within a few feet of a branch they suddenly lurched upwards, snapping off a horizontal twig with their *feet*, then speeding away in full flight. This performance was repeated four times in three-quarters of an hour, and that ended their activities for the two hours that I watched.

The twig chosen in each case was a short, horizontal off-shoot of the main branch, an off-shoot that would break off rather than bend. Being little more than ten feet from the twigs taken, I am certain that the beak played no part in the gathering. This pair was building in the open fireplace chimney of S. A. Fraliegh, about 100 yards distant from the dead trees. On July 2nd the nest, fully completed, contained one egg. The Fraliegh family were unaware of the presence of the Swifts until I asked permission to investigate the chimney. — M. G. STREET, NIPAWIN, SASK.

YELLOW-BREASTED CHAT IN NEW BRUNSWICK —Credit for the first record of the Yellow-Breasted Chat (*Icteria virens*) in the Maritime Provinces must go to Allan Moses of North Head, Grand Manan. This specimen, a male, was found December 1, 1941, and had been dead about a week. It is now in the Moses Museum in Grand Manan. Mr. Moses also saw a Yellow-Breasted Chat a year previously, in 1940, but this one was not collected.

On December 11, 1942, another male Yellow-Breasted Chat was picked up dead by a schoolchild in St. Andrews, the most southwesterly point on the mainland of New Brunswick, and about twenty-five miles north of Grand Manan Island. This specimen was sent to the New Brunswick Museum for identification, and, although it was said to have been quite fresh, it was so badly putrified when we received it, that the skin could not be preserved. There need be no doubt concerning its identity, as it conformed in every detail to the published descriptions of E. H. Forbush and other authors, and was also compared with specimens already in the Museum collection. Moreover, the writer became quite familiar with this species during two years' residence in central Ohio, even accompanying members of the staff of the Ohio State Museum, Columbus on a trip into southern Ohio, one of the purposes of which was to obtain this species for that Museum's collection.

Knight (*Birds of Maine*, 1908) gives only three summer records of this species in York and Cumberland Counties of southern Maine, so that these winter records in New Brunswick are all the more difficult to explain.

When the St. Andrew specimen was found a light snow was falling, although the ground had been bare for some time, and the temperature was 33° F. There were no southerly gales which might have brought the Chat north at this period—north and northwest winds having prevailed for a week or more.—W. A. SQUIRES, NEW BRUNSWICK MUSEUM, ST. JOHN, N. B.

STATEMENT OF FINANCIAL STANDING OTTAWA FIELD-NATURALISTS' CLUB, DECEMBER 2, 1943

CURRENT ACCOUNT

ASSETS		LIABILITIES	
Balance in Bank, Dec. 2, 1943	$ 375.54	Reserve Fund	15.02
Bills Receivable	85.46	Balance	445.98
	$ 461.00		$ 461.00
RECEIPTS		**EXPENDITURES**	
Balance in bank, Dec. 7, 1942	377.55	Canadian Field-Naturalist	581.55
Fees:-		Editor	30.00
Current	653.05	Separates and Illustrations	196.72
Advances and Arrears	76.65	Postage and Stationery	81.59
Separates and Illustrations	115.53	Excursions Committee	3.58
Single and Back Numbers	48.90	Miscellaneous	13.80
Excursions Committee	4.86	Bank Discount	18.55
Miscellaneous	24.79	Balance in Bank, Dec. 2, 1943	375.54
	$ 1,301.33		$ 1,301.33

RESERVE FUND

ASSETS		LIABILITIES	
Canadian Government Bonds	1,500.00	Nil	
Balance in Bank, Dec. 2, 1943	123.33		
	$ 1,623.33		
RECEIPTS		**EXPENDITURES**	
Balance in Bank, Dec. 7, 1942	232.55	Purchase of Bonds	200.00
Bond Interest	88.50	Balance in Bank, Dec. 2, 1943	123.33
Bank Interest	2.28		
	$ 323.33		$ 323.33

PUBLICATION FUND

ASSETS		LIABILITIES	
Canadian Government Bonds	1,000.00	Nil	
Balance in Bank, Dec. 2, 1943	160.19		
	$ 1,160.19		
RECEIPTS		**EXPENDITURES**	
Balance in Bank, Dec. 7, 1942	94.89	Nil	
Bond Interest	63.75		
Bank Interest	1.55	Balance in Bank, Dec. 2, 1943	160.19
	$ 160.19		$ 160.19

Audited and found correct.

Harrison F. Lewis
W. H. Lanceley
Auditors

I. L. Conners
Treasurer

SIXTY-FIFTH ANNUAL MEETING OF THE OTTAWA FIELD-NATURALISTS' CLUB

REPORT OF COUNCIL

MEETINGS. — During 1943 there were two council meetings held in the office of the Agricultural Representative, 295 Albert St., Ottawa. The first meeting was held on January 14, and fourteen members were present. The second meeting was held on November 20, and fifteen members were present.

EXCURSIONS AND LECTURES COMMITTEES. — Ten field excursions and five lectures were held this year. The excursions were as follows:

May 1 — Billings Bridge
May 8 — McKay Lake
May 22 — McKay Lake
May 29 — Experimental Farm and Rideau River.
June 12 — McKay Lake
June 19 — Britannia
Sept. 11 — Bank of Ottawa River, Ottawa W.
Sept. 25 — McKay Lake
Oct. 9 — Val Tetreau
Oct. 23 — Woods near Ottawa South Tennis Club

It will be noted that four visits were paid to McKay Lake. In arranging these trips the Committee had in mind the advisability of making a more intensive study of a small locality and noting the seasonal changes in flora and fauna.

There was an average attendance of thirty-five at the spring excursions but the weather was unfavourable for some of the fall excursions and attendance was less.

The following lectures were given:

Jan. 21 — A summer on the shores of the Arctic by Dr. C. H. D. Clarke.

Feb. 18 — Talk on birds by Dr. H. F. Lewis — illustrated by three motion pictures of birds which were obtained through the courtesy of the National Film Society.

Mar. 18 — Talk on Mushrooms by Mr. H. A. C. Jackson — illustrated by his own paintings.

Apr. 1 — Talks by excursion leaders on the flora and fauna of early spring.

Nov. 16 — Review of the natural history of McKay Lake based on the field excursions.
—Geology - Dr. Alice Wilson.
—Birds - Graham Cooch.
—Botany - H. Groh.
—Water Biology - Rev. F. E. Banim.

The study groups in botany and birds were discontinued last winter due to low attendance but a group studying mosses continued to meet throughout the winter.

Total financial receipts for the year were $47.00 and expenses of $42.14 leaving a balance of $4.86.

PUBLICATIONS COMMITTEE — The Committee has continued to publish the *Canadian Field-Naturalist* although the numbers have been late in appearing. Some of the issues have been published as double numbers under one cover without any decrease in the number of pages. It has been necessary to again change the printer for the *Canadian Field-Naturalist*. The Jackson Press, Kingston, had stated that they were unable to carry on under the terms of the original contract, but before any changes were made their plant was destroyed by fire. Other tenders for the contract were called for and the magazine is now being printed by Mr. V. H. Sheppard, The Reporter Printing Co., of Sutton West, Ontario.

BIRD CENSUS COMMITTEE — The Christmas bird census report was published in the Feb.-Mar. number of the *Canadian Field-Naturalist*. Fewer birds than usual were observed and there were no rare species noted. The Ring-necked Pheasant showed a definite increase. A total of 19 species and 1,644 individuals was reported.

ACKNOWLEDGMENTS. — The Council of 1943 wishes to take this opportunity to express its appreciation to the authorities of St. Patrick's College for placing rooms and equipment at the disposal of the club; and to Mr. W. M. Croskery, Agricultural Representative, for the use of his office for meetings of Council. During the year the club has received donations of back numbers of the *Canadian Field-Naturalist*. These are gratefully acknowledged. The Council is indebted to those members who have assisted with excursions, winter lectures and other club activities.

— J. WALTON GROVES, *Secretary*

BOOK REVIEW

NORTHERN FISHES WITH SPECIAL REFERENCE TO THE UPPER MISSISSIPPI VALLEY. *By Samuel Eddy and Thaddeus Surber; The University of Minnesota Press, Minneapolis, November* 19, 1943; 252 *pages*, 93 *illustrations*, 9 *in colour. Price U.S.* $4.00

It appears still a debatable question whether birds or fishes rank first in the economic life of a nation like Canada - or any other nation for that matter. On consulting one of the Canadian Government's most valuable publications: "The Canada Yearbook" we may be misled in attaching any significance to the fact that,in a volume chosen at random (1941), we find in the index some 24 references to fishes, fish industry and fishing generally. The same index does not contain a single reference to birds, bird life, wild life, wild fowl. Yet, among many, I am the proud possessor of Taverner's classical *"Birds of Canada"* and recently enjoyed examining the almost life-size paintings by Audubon, available - of all places - in the library of the Parliament building at Fredericton, N.B. Where in Canada may we find a corresponding volume to the Birds of Canada treating of fishes? Abundant and valuable research is conducted on fish life by men like Huntsman, Dymond, Harkness, Taylor, White and many others and many a government derives a lucrative return from leasing streams and lakes, but no one has so far embarked upon the problem of providing the general public of Canada with a textbook on even fresh water fishes alone! That is positively deplorable, especially since most of the data exist, but never have been published since C. W. Nash's *Check List of the Fishes of Ontario* in his *Manual of Vertebrates of Ontario* (1908).

It is therefore indeed a pleasure to bid a welcome to Eddy and Surber's *"Northern Fishes"* as covering the Upper Mississippi Valley in a very plausible and effective manner. Now I do not wish to emphasize the region especially, for with few exceptions, we meet with old friends taken in Canadian waters. Indeed the volume is an authoritative presentation of the subject from many varied angles and will be a most welcome addition to the library of any Fish and Game club and many a follower of the sport and pastime glorified by Sir Izaak Walton "doubt not, but angling will prove to be so pleasant, that it will prove to be - like virtue - a reward to itself."

Dr. Eddy, who was persuaded, we are told, to offer a course on "Fishes and Fishing in Minnesota" to business and professional men through the University of Minnesota's extension division not only "gave the amateur fishermen the kind of information they wanted" but obviously benefited from the inquisitiveness of his audience - or a book of the type before us could not have been so wholly comprehensive of the practice and science of fishing and fish. In this he was very materially assisted by Mr. Surber who himself has been specialist on the subject for the last half century. The collaboration has indeed produced a very happy result and a much needed textbook is made available to Canadian readers by the generosity of American authors and publishers alike. The coloured illustrations apparently are Kodachromes and the illustrations in black and white from original photographs. Good and practical keys are provided for the student from which determinations may be made with the least confusion and the authors explain and illustrate many of the terms employed and thus assist materially in dispelling any misconception on the part of the uninitiated reader. The book is bound to meet with the success it deserves.

— H. T. GÜSSOW

THE ROLE OF *SPHAEROSPONGIA TESSELLATA* IN THE MACKENZIE RIVER DEVONIAN[1]

By P. S. WARREN

Department of Geology, University of Alberta, Edmonton

THE DEPARTMENT OF GEOLOGY, University of Alberta, has received a collection of Devonian fossils from Mr. A. F. Kozisek, a trapper from Aklavik, N.W.T., said to be collected from Anderson river at the first falls, eight miles below Simpson creek, outlet to Simpson lake. Anderson river is north of Great Bear Lake and flows into the Arctic Ocean. The Anderson river drainage system lies wholly within the Arctic circle.

Devonian fossils from Anderson river were first collected by Mr. R. MacFarlane, Chief Factor of the Hudson Bay Company in 1857[2]. MacFarlane's collections were studied by Meek[3], who considered them to be of Middle Devonian (Hamilton) age. It is interesting that Mr. Kozisek's collection has very little in common, so far as individual species are concerned, with MacFarlane's collection as identified by Meek.

The Kozisek collection from Anderson river has been identified by the writer as follows:

Sphaerospongia tessellata (Phillips)
Zaphrentis ? recta Meek
Cyathophyllum ? sp. not det.
"Acervularia davidsoni" ? E. & H.
"Acervularia" sp. nov.
Cystiphyllum sp. not det.
Favosites cf. *F. alpenensis* Winchell
Cladopora sp. not det.
Atrypa reticularis (Linn.)
Atrypa spinosa Hall

Undetermined pelecypod and gastropods.

Attempts to place this fauna in its exact horizon in the Devonian proved interesting. In the Mackenzie valley Middle and Upper Devonian alone are represented, the Lower Devonian never having been reported. The presence of *Favosites* in the collection listed above, immediately places its age as Middle Devonian because *Favosites* has not, so far, been found in the Upper Devonian of the Mackenzie Valley. The same statement probably holds true for all North America. The exact horizon of this fauna in the Middle Devonian is not so easy to determine.

Three definite faunal horizons have been determined in the Middle Devonian of the Mackenzie valley. The oldest, represented by the Pine Point limestone on Great Slave lake, contains a fauna which can usually be determined by *Martinia? sublineata* (Meek) and a large variety of *Atrypa reticularis* with a widely flared margin (var. *A.* of Whiteaves). In the lower Mackenzie valley, the Pine Point limestone appears to be represented by the Hare Indian River shale, which is largely unfossiliferous. The second horizon on Great Slave lake is the Presqu'ile dolomite in which *Stringocephalus burtini* Defrance and *Favosites limitaris* Rominger are considered diagnostic. In the Lower Mackenzie, the Presqu'ile dolomite is represented by the Ramparts limestone, which contains the same two fossils as well as *Newberria laevis* (Meek) and *Martinia? meristoides* Meek, which appear to be largely confined to this horizon and to have a wide distribution. The third and youngest horizon on Great Slave lake is the Slave Point limestone, with *Hypothyridina venustula* (Hall) and *Cyrtina hamiltonensis* Hall as diagnostic fossils. In the lower Mackenzie the Beavertail limestone replaces the Slave Point limestone, and in this area *Hypothyridina venustula* appears to be replaced by *Hypothyridina castanea* (Meek). *Hypothyrdina "cuboides"* has also been reported from horizons in the Upper Devonian in the Mackenzie valley. But it is quite probable that this Upper Devonian form should be referred to *H. emmonsi* (Hall and Whitfield).

1. —Received for publication September 25, 1943.

2. —MacFarlane, R., On an expedition down the Begh-ula or Anderson River. Canadian Record of Science, Vol. 4, p.28, 1890.

3. —Meek, F. B. , Remarks on the geology of the valley of the Mackenzie river, with figures and descriptions of the fossils from that region, in the Museum of the Smithsonian Institution, chiefly collected by the late Robert Kennicott, Esq.: Trans. Chicago Academy of Sciences, Vol. 1, pt. 1. pp. 61-114, pls, 11-15, 1868.

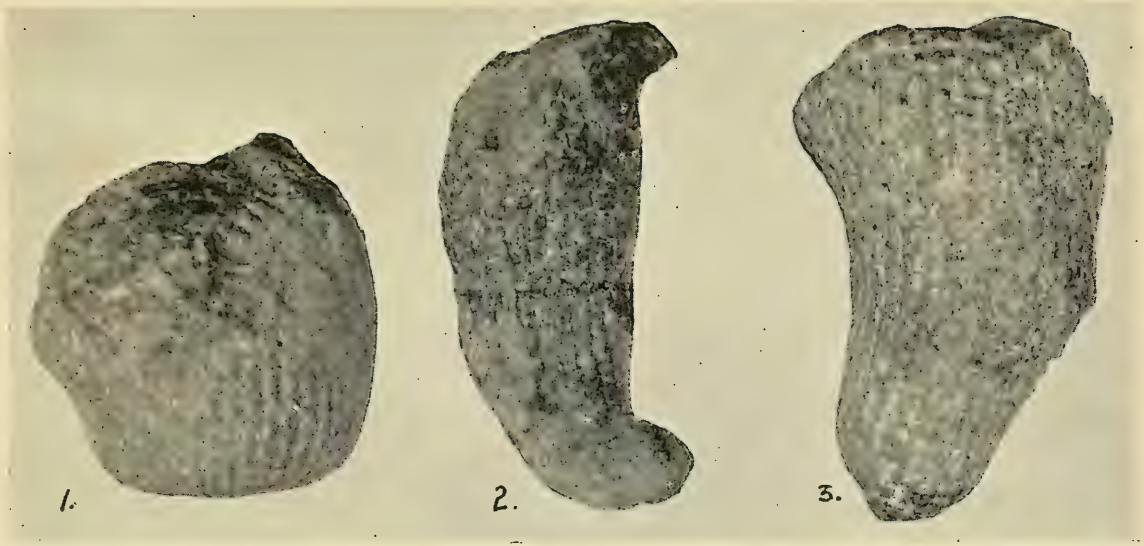

PLATE I

Three specimens of *Sphaerospongia tessellata* showing variation in form. They represent internal molds except for the upper left hand corner of figure 1 where the spicular layer is preserved.

A perusal of the list of fossils in the Kozisek collection shows a lack of any of the diagnostic fossils so far used as definite horizon-markers in the Mackenzie area. It is quite possible that some of the corals should be useful time markers, but till the Devonian corals of the Mackenzie valley are thoroughly studied and revised, they are of little use for fine stratigraphic work. For instance, the coral *Acervularia davidsoni* E. & H. has been identified by various geologists as occurring in the Middle Devonian, and it has also been reported from higher horizons. The species has probably been very liberally interpreted, and the specimens identified by the writer in the Kozisek collection as *A. davidsoni*? are without doubt not the true *A. davidsoni* of Edwards and Haime. The *Atrypas* also show some distinctive varieties, but notwithstanding the many species and varieties of this ubiquitous genus so far named from the Devonian, our present varieties appear to be new.

As the corals and brachiopods failed to be of stratigraphic assistance, attention was turned to the problematical sponge, *Sphaerospongia tessellata.* This form was first found in the Devonian of south Devon, and named by Phillips *Sphaeronites tessellatus* under the impression that the form represented an Echinoderm[4]. It is quite common in the Rhine Devonian section where it occurs in the *Stringocephalus burtini* zone. Its occurrence in Manitoba, Canada, was reported by Whiteaves[5] where the species is common in, and confined to, the *Stringocephalus* beds, otherwise the Winnipegosan dolomite[6]. The species also occurs in Kimberly district in Western Australia[7] where it appears in the *Stringocephalus* horizon though that genus is not represented in the fauna.

It appears from the foregoing citations that *Sphaerospongia tessellata* is a very good index fossil for the *Stringocephalus* zone of the Middle Devonian and that the collection under review probably came from that horizon. The *Stringocephalus* horizon in the lower Mackenzie valley is represented in the Ramparts limestone and that formation is, therefore, proved to extend as far east as Anderson river.

Though many collections of fossils from the Middle Devonian of the Mackenzie valley have been studied, *Sphaerospongia tessellata has,* up to the present, not been reported. This may mean that the species is not common or has not a very wide distribution. It is very probable, however, that the species has been overlooked while collecting. In the Kozisek collection it is represented by three specimens which, for the most part, are interior molds. Part of one specimen shows the curious arrangement of interlocking "spicules", with the outer layer of hexagonal plates missing. As internal molds only, the specimens strongly resemble a poorly preserved coral, and such specimens might easily be discarded in the field by a collector who is unacquainted with the species and who must always consider the weight of his load. The three specimens in the collection are shown on the accompanying plate (I). It is hoped that they may prove a guide to future collectors.

4. —Phillips, J., Figures and descriptions of the Palaeozoic fossils of Cornwall, Devon and west Somerset, p. 135, pl. 59, fig. 49, London, 1841.

5. —Whiteaves, J. F., The fossils of the Devonian rocks of the islands, shores or immediate vicinity of Lakes Manitoba and Winnipegosis. Geol. Surv. Can., Contributions to Canadian Palaeontology, Vol. 1, Pt. IV, H. 6, p. 259, pl. 33, 1892.

6. —Kindle, E. M., The Silurian and Devonian section of western Manitoba: Geol. Surv. Can., Sum. Rept., p. 252, 1912.

7. —Teichert, Curt, The Devonian of Western Australia. A preliminary review: Amer. Journ. Sci. Vol. 241, pp. 81 and 170.

CURRENT LITERATURE

NOTES ON THE CYPERACEAE OF SASKATCHEWAN. II CAREX, *by G. F. Ledingham and W. P. Fraser. Amer. Midl. Nat. Vol. 29, No. 1, pp. 42-50, January, 1943.*

A list of 98 species and varieties of *Carex* occurring in Saskatchewan is presented. Brief notes on each are included as well as general and local ranges. — HAROLD A. SENN.

BOOK REVIEW

COMMON EDIBLE MUSHROOMS: *By Clyde M. Christensen; The University of Minnesota Press, Minneapolis.* 124 pp., 4 *coloured pls.*, 62 *half tones*, 2 *diagrams. January*, 1943. $2.50.

This book is intended as a guide for the beginner who wishes to collect mushrooms for the table. The author emphasizes the fact that there is no rule or test for distinguishing poisonous and edible mushrooms. The only safe procedure is to avoid all but those of which the species can be recognized with certainty. In a section entitled "The Foolproof Four", attention is directed to four kinds of fungi which are edible and are sufficiently distinct that they are unlikely to be confused with others. These are the morels, puffballs, sulphur polypore, and shaggy mane. The beginner is advised to confine his attention to these at first. The common meadow mushroom is not included but it is possible to confuse it with the poisonous *Amanita* species in the button stage.

There is an interesting general introduction followed by descriptions of fifty-five species written in non-technical language and omitting microscopic characters. The species are grouped into "Mushrooms with Gills" and "Mushrooms without Gills". This terminology is unfortunate as it is usual and desirable to restrict the term mushrooms to the gilled fungi only.

The mushrooms are grouped according to spore colour, but have not been arranged in the form of a key. This is, perhaps, not important where relatively few species are discussed and these are species with more or less outstanding characteristics. However, a brief key to the genera might be of assistance to the beginner.

The species described are well illustrated with excellent photographs. The value of the photographs would have been enhanced if the magnification had been stated. For example one unfamiliar with the species might conclude from figs. 49 and 50 that *Coprinus micaceus* was a larger plant than *C. atramentarius*. There are four plates in colour, illustrating eighteen species but unfortunately the colour reproduction is not very satisfactory.

The book concludes with an excellent section on Mushroom Cookery which will undoubtedly prove of great interest to many. There is a short bibliography of books on mushrooms and mushroom growing, and the book is well indexed. — J. W. GROVES.

CURRENT LITERATURE

MATERIALS FOR A FLORA OF THE CONTINENTAL NORTHWEST TERRITORIES OF CANADA. *By A. E. Porsild. Sargentia* IV: 1-79. *September*, 1943.

This work will rapidly come to occupy a major place among sources of reference on the flora of northwestern Canada. It is based for a large part on collections made by the author or the author and his brother, R. T. Porsild, in the years 1927-1928, 1931, and 1932-35. The present known flora of the Mackenzie and Keewatin Districts is stated to consist of 761 plants, of which 345 are listed in the present paper. Nearly 100 of these are new to the flora of the Northwest Territories and 14 are reported as new to the flora of Canada. A total of 19 new species, varieties, combinations or names are proposed in the following genera: *Calamagrostis, Poa, Kobresia, Carex, Melandrium, Thlaspi, Potentilla, Oxytropis, Astragalus, Gentiana, Antennaria*, and *Petasites*. Particularly important contributions are made to our knowledge of *Braya* (Cruciferae), *Oxytropis* (Leguminosae) and *Melandrium* (Caryophyllaceae), a key to the species of *Melandrium* in arctic North America being presented.

Sargentia is a relatively new publication of the Arnold Arboretum of Harvard University, being essentially a continuation of Contributions of the Arnold Arboretum. It is devoted almost entirely to longer taxonomic papers in botany. — HAROLD A. SENN.

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Zoology	R. A. WARDLE, M.Sc.	
Botany	C. W. LOWE, M.Sc.	R. HADDOW

Meetings are held each Monday evening, except on holidays, from October to April, in the physics theatre of the University, Winnipeg. Field excursions are held each Saturday afternoon during May, June and September, and on public holiday during July and August.

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All meetings at 8 p.m., Room 100, Applied Science Building, University of British Columbia, unless otherwise announced.

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Past President: CAPT. R. G. CUMMINGS.
President: DR. H. B HITCHCOCK.
Sec'y-Treas.: MRS. W. G. GIRLING, 537 Colborne St.

Meetings are held at 7.30 p.m. in the Public Library building on the second Monday of each month from October to April.

Field trips are held during the spring and a special excursion in September.

BRITISH COLUMBIA BIRD AND MAMMAL SOCIETY

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THE CANADIAN FIELD-NATURALIST

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CONTENTS

PAGE

Black-Crowned Night Heron Nesting in Lincoln County, Ontario. By R. W. Sheppard 31

Preliminary Report on the Birds and Mammals of Kootenay National Park, British Columbia. By J. A. Munro and I. McTaggart Cowan 34

Amendments to By-Laws. Ottawa Field-Naturalists' Club 51

To Babes Really Lost in the Woods. By Paul L. Errington 52

The Susceptibility of Fur-bearing Animals and Game Birds to Tularaemia. By John H. Brown 55

The Garry Oak in British Columbia. By R. Glendenning 61

Lawrence Bedford Potter, 1883-1943. By J. Dewey Soper 66

Notes and Observations:—

English Bird Notes. By A. L. Rand 68

The Swamp Cricket Frog *Pseudacris nigrita triseriata* (Wied) in Quebec. By A. Stanley Rand 68

Occurrence of the Chimney Swift at Harrington County, Quebec. By Laura N. Thompson 69

Current Literature 33, 69

Book Reviews 65, 70

The official publications of THE OTTAWA FIELD-NATURALISTS' CLUB have been issued since 1879. The first were *The Transactions of the Ottawa Field-Naturalists' Club*, 1879-1886, two volumes; the next, *The Ottawa Naturalist*, 1886-1919, thirty-two volumes : and these have been continued by *The Canadian Field-Naturalist* to date. *The Canadian Field-Naturalist* is issued bi-monthly. Its scope is the publication of the results of original research in all departments of Natural History.

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BLACK-CROWNED NIGHT HERON NESTING IN LINCOLN COUNTY, ONTARIO[1]

35,343

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By R. W. SHEPPARD

Niagara Falls, Ontario

ON SEVERAL OCCASIONS during the month of April, 1943, while driving along the Lake shore road between Port Weller and the village of McNab in Grantham township, Lincoln County, Ontario, I observed large numbers of night herons, *Nycticorax nycticorax*, resting at the tops of trees and flying over a small piece of woodland, a few hundred yards across the fields toward the lake. On April 22, an opportunity arose enabling me to visit the woodland which proved to be about 5 acres in extent and to contain, among other trees, maple, elm, beech, linden, oak, and wild cherry. The visit was made in company with R. V. Featherston of the Niagara Plant Protection staff, and between us we counted, looking across the wood through the bare branches of the trees, upwards of 200 nests in various stages of construction or repair. Night herons in large numbers, possibly several hundred, were seen resting at the tops of the nesting trees, or taking short flights over and just beyond the woods.

Although herons were observed from afar, and in varying numbers around these woods on several other occasions during the late spring and early summer, no suitable opportunity arose to again investigate the nesting colony until July 1, on which day a prolonged visit, toward the latter part of the afternoon, was made in company with Dr. W. E. Hurlburt and G. H. Dickson of Vineland. On this occasion, the heronry was in a great state of activity with young birds on the nests, and climbing around in the nesting trees in considerable numbers; while many others were both seen and heard scrambling and sliding down through the branches to the ground. In the vicinity, and along the edge, of a dismal looking pool toward the west side of the wood, a number of well grown young were actively running around for all the world like a flock of grotesque looking chickens. Here in this part of the wood, the heronry was thickly populated, gloomy, dirty and odoriferous, and devoid of the undergrowth of beech and other saplings, which elsewhere made the nesting wood almost attractive in contrast. In addition to the active flock of young birds on the ground near the pool, a few cripples, and some dead young were found here and there over the floor of the wood, where also broken egg shells in some numbers were seen scattered around. One unbroken egg found lying on the ground was collected, and later preserved in formalin, being too ripe to blow. Several grounded young birds, captured after a short chase by Mr. Dickson, showed plenty of fight when handled, but quickly ran off into the long grass or undergrowth when released. The numerous groups of nests, now partially obscured by heavy foliage, appeared to vary in density in different parts of the wood, but ranging from one to seven or more per tree, were found in general to be placed at a height of from 30 feet to 60 feet in Linden, Beech, Elm, or Maple; the apparent tree preference being in the order given. As our small party passed under the trees, especially in those parts of the wood where nests were most thickly congregated, fish (apparently referable to the species known as alewife, branch herring, or gaspereau, *Pomolobus pseudohargengus* Wilson) in all stages and processes of digestion, but occasionally entire and reasonably fresh, literally rained down about us. In some spots the showers of fish, and fish parts, were so heavy that our observations on the birds were more than a little distracted by our anxiety to avoid the disaster of a direct hit by one or more of the slimy missiles. While passing along the northern edge of the wood nearest the lake, sometimes as many as twenty or thirty adult birds were seen in

1. —Received for publication January 3, 1944.

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the air over the adjacent fields at one time, and just before leaving the nesting area, thirty or more night herons were counted as they perched in a fairly compact group among the upper and interlocking branches of two or three spreading, and roundish headed, choke cherry trees. The presence of many other adult birds in the nesting area was apparent, but thick foliage largely obscured our view of such birds flying over the woods as we passed through them, but of sounds and other signs, there were an abundance. It was estimated that of the nesting birds plainly seen at the time of our visit on July 1, approximately half were in full breeding plumage, the others appearing to be subadults in a variety of transition plumages.

Personal observations over a prolonged period would tend to indicate a recent and very substantial increase in the night heron population along the Lincoln County shore line of Lake Ontario, as well as in the ship-canal area between Thorold and St. Catharines. That this large increase in the local population of night herons has been remarked upon by others is evidenced by a letter received from Wm. L. Putnam of Vineland Station under date of June 15, 1943. The subject matter of this letter is of such particular interest, and so very pertinent to the foregoing account of the night heron colony at Port Weller, that certain passages may most appropriately be quoted here. Mr. Putnam's letter commences:-

"You will be interested to learn that extraordinary numbers of night herons are appearing here, fishing in a gull-like manner in the lake. In early May a number of night herons were noticed in the mornings along the little stream through the farm, and some frequently spent the day in the woodlot. Other flocks were noticed flying west along the lake shore at dusk. As the month progressed the number of birds increased and flight began earlier in the day, until for nearly the past two weeks some birds have been almost continually in sight throughout the day, presumably as the food requirements of the young increased. On the evening of June 11, a total of 198 birds passed westward between 7.45 and 9.00 p.m., while nearly the same number returned east. Such numbers are not seen every day, however, many probably being satisfied before reaching this point on days when the fishing happens to be good."

While farther on in his letter Mr. Putnam goes on to say:-

"The herons usually fly between 15 and 50 feet above the lake, and on sighting a fish drop with dangling legs. Usually the bird touches the surface with its body momentarily without folding its wings, spears the fish just below the water and immediately takes off. At other times the wings may be folded and the heron floats as buoyantly as a gull. It also rises from the surface as easily as a gull. In fact the whole performance is remarkably gull-like."

That the newly discovered and here recorded black-crowned night heron colony near Port Weller in Lincoln County is the largest ever found in the Province of Ontario would appear to be more than probable for a careful count of nests throughout the wood, made this winter, after the leaves had fallen, with the help of Mr. F. W. Gregory, a fellow employee of the Plant Protection Service, revealed the presence of not less than 500 nest structures of varying sizes, but all undoubtedly attributable to the species in question. Whether or not all of these nests, which in some parts of the wood were so thickly placed that 15 or 16 could be counted in one moderate sized tree, housed their quota of young, it is impossible to say, but certainly many more than half the total number had ample size and every appearance of having been used during the past breeding season.

A review of previously known Ontario nesting colonies, based on information kindly supplied to me by J. L. Baillie Jr. of the Royal Ontario Museum of Zoology, would appear to fully support the belief that the Port Weller colony surpasses in size all heretofore recorded night-heronries in the Province; but it would seem advisable to set forth in some detail, here and at this time, such information as is at present available to us on these earlier breeding records.

Probably the earliest record of the black-crowned night-heron nesting in Ontario is that of J. Townson (Baillie and Harrington, *Trans. Roy. Can. Inst.* V. 21: Pt. 1, 1936, p. 10) who reported some 4 pairs nesting about the year 1872 in dense willows near Leslie's nurseries at Ashbridges Bay, Toronto. There have been one or two more recent reports from York County of a few nests found by R. J. Rutter (1934) along the lower Hum-

ber River, but there was apparently no evidence of young being reared at the time.

In Lambton County, a female bird was killed in May, 1909, on Walpole Island by Mr. Meredith who reported the species as being very common and nesting on the ground in such numbers that he could have gathered a bushel of eggs with ease (P. A. Taverner, *Ottawa Nat.*, V. 32; No. 5, Nov. 1918, p. 97). Except that P. Harrington has a set of three eggs taken by W. Purdy from a large colony "at the flats" on May 14, 1921 (Baillie and Harrington *loc. cit.*), there does not appear to be any more recent information available on this Walpole Island heronry.

For Carleton County, Ottawa area, Hoyes Lloyd (*Can. Field-Nat.*, V. 37: No. 7, Oct. 1923, p. 125) simply says "Common summer resident, breeds", and mentions immatures being taken in July and August, but does not amplify his statements. G. Eifrig (*Auk*, V. 26, No. 1, Jan. 1909, pp. 58-9) writes of "An old established breeding colony" on Kettle Island near Ottawa, but that record would appear to belong more properly to Quebec Province. In more recent years, according to a letter to J. L. Baillie Jr. from P. A. Taverner, under date of Dec. 2, 1936, a pair nested at Ottawa in 1935 and 1936, in the grounds of the late E. F. G. White on Wurtemburg Street.

On Pelee Island in Essex County, there is a well known colony which appears to have been first visited on August 9, 1930 by Prof. Rudolf Bennitt, and reported upon by R. L. Baird (*Bird-Lore*, V. 32, No. 6, Nov.-Dec. 1930, p. 434-5). E. H. Emery visited the island twice in June, 1932, and found two colonies containing 20 and 11 nests respectively. The following year, 1933, Emery, Baillie, and Harrington counted 40 and 10 nests in the two colonies. On July 3, 1936, H. H. Southam, visiting the nesting areas for banding purposes, found about 100 occupied nests (Baillie and Harrington, *loc. cit.*)

In the Hamilton area of Wentworth County, G. W. North examined 3 nests and found two young birds at Van Wagner's Beach on July 23, 1936 (Baillie and Harrington, *loc cit.*). When North revisited this small colony in 1937 he found 15 nests, and one examined contained three eggs. On May 18, 1938, the colony was visited by Mrs. D. Speirs and others, but at that time only 8 nests were found.

Near the village of Byron, in Middlesex County on August 1, 1936, K. Reynolds found two adult birds with two young. On May 6, 1939, the late Dr. W. E. Saunders pointed out to J. L. Baillie Jr. and others, at a spot on the banks of the Thames River near London, a populated night-heronry containing 14 nests built in Maple and Beech trees.

At Bradley's Marsh, near the mouth of the River Thames in Kent County, 20 nests were found in a pure stand of narrow-leaved cat-tail reeds, in the spring of 1939, and of those, 13 nests were examined on May 19, and all found to contain eggs or young (A. A. Wood, Geo. M. Stirrett and D. A. Arnott, *Can. Field-Nat.*, Vol. 55, No. 2, Feb. 1941, p. 15). In a letter dated October 25, 1943, A. A. Wood states that from 1940 to 1942 the colony nested in the same stand of cat-tails, but was smaller in those years. In 1943, the colony moved farther out into the marsh, and Mr. Wood did not visit the nests, but he believes that they reared young as before.

On the Beverly Lake, in Leeds County, according to G. C. Toner, W. E. Edwards and M. W. Curtis, (*Can. Field-Nat.*, Vol. 56, No. 1 Jan. 1942, p. 11) C. E. Broley has stated that a few pairs breed each year near the lower lakes.

CONTRIBUTIONS TO THE FLORA AND PHYTOGEOGRAPHY OF SOUTH-WESTERN GREENLAND: AN ENUMERATION OF THE VASCULAR PLANTS, WITH CRITICAL NOTES. *By Nicholas Polunin. Journal of the Linnean Society of London. Vol.* **LII** *No.* 345 *pp.* 349-406. *October* 1943.

This enumeration is based largely on collections made by the author during July and August, 1937. "At least eleven species..... were added to the known flora of Greenland, as well as further intraspecific or other minor entities". This flora consists of approximately 313 species, the flora of all Greenland comprising slightly over 400. New entities are described in the genera *Carex*, *Stellaria* and *Lomatogonium*. — HAROLD A. SENN.

PRELIMINARY REPORT ON THE BIRDS AND MAMMALS OF KOOTENAY NATIONAL PARK, BRITISH COLUMBIA[1]

By J. A. MUNRO *and* I. MCTAGGART COWAN

Okanagan Landing, B. C. and University of British Columbia, Vancouver, B. C.

INTRODUCTION

FIELD WORK in connection with a faunal survey of Kootenay National Park was carried on by Munro from June 8 to June 28, 1943. The trapping of small mammals was the chief activity, the observation of birds and the collecting of specimens when necessary being incidental to this work. Cowan spent April 29 and the period June 23 to June 28, 1943 studying the larger mammals of the region and using whatever opportunities occurred to obtain information regarding birds and small mammals.

The survey was of necessity a preliminary one and much work remains to be done. In the time available it was not practicable to visit the alpine sections of the park, nor could the numerous vertebrate habitats be studied in detail. The area, being a cross-section of the west slope of the Rocky Mountain system, is of considerable zoological interest and would well repay further study.

The following account of the birds and mammals is based on the limited activities outlined above and supplementary data obtained from the park wardens. Apparently no other zoological investigations have been made within the park.

PHYSIOGRAPHY

Between the semi-arid Rocky Mountain Trench and the Continental Divide lie a series of mountain ranges separated by lateral valleys. Here are the sources of rivers that flow westward to swell the great Columbia as it moves toward the Pacific Ocean. Two of them, the Kootenay and its tributary the Vermilion, have formed wide valleys and it is observed when ascending them that the dry climate of the Kootenay Plain gradually gives way to one of increasing moisture, a feature that is reflected in the forest types and the animals that inhabit them. Kootenay National Park, from the gateway in the Columbia River Valley to Vermilion Pass on the Continental Divide, spans the width of this mountainous, forested territory and thus provides a satisfactory cross-section for zoological studies.

The park consists of a strip 10 miles wide, east to west and 50 miles long, southeast by northwest, the greater part lying in the valley of the Kootenay and Vermilion rivers. The west boundary of the park follows the summits of the Briscoe and Vermilion Ranges that are separated by the valley of the Kootenay River; the east boundary follows the summits of Hawk Ridge and the Mitchell Range that are separated by the valley of the Simpson River. These boundaries are about equi-distant from a section of the Banff-Windermere Highway that traverses the park. From various points along the highway a view of the whole width of the park and its approximate boundaries may be obtained. The region is well supplied with numerous streams tributary to the rivers mentioned and except on recent burns is heavily forested in the valley bottoms and on the lower mountain slopes.

The highway enters the park at Radium, altitude 2,644 ft. and, following up Sinclair Creek, crosses an outlying ridge of the Briscoe Range at Sinclair Pass, altitude 4,875 ft. It then descends a thousand feet to the valley of the Kootenay River which it crosses and continuing over a low summit enters the valley of the Vermilion River which it follows to Vermilion Pass, altitude 5,264. Thus in the territory made accessible by the highway there is an altitudinal relief of nearly 3,000 feet with changes in the forest types as summarized below.

The section from Radium to Sinclair Pass is rough, broken country with a lodgepole pine and Douglas fir association forming the main forest cover. In the narrow valley of Sinclair Creek is a riparian growth of Engle-

1. —Received for publication January 14, 1944.

mann spruce, western red cedar, black cottonwood, aspen, mountain alder, mountain birch, and dogwood. This is the area of least precipitation.

Northward along the Kootenay Valley, Douglas fir gradually disappears, Englemann spruce is first in importance on the river bottom along creeks and in muskegs, and alpine fir first appears. Under primitive conditions Englemann spruce probably prevailed over large areas above the valley bottom proper and in course of time was largely replaced after fire by lodgepole pine. This is now the prevailing forest type. Some of the older pine forests are park-like with little underbrush. Deciduous trees are chiefly aspen, black cottonwood, and western white birch.

Between the predominantly lodgepole pine forest of the Kootenay Valley and the forest of the Vermilion Valley farther north where Englemann spruce predominates is a wide belt of burnt-over territory now in process of reforestation chiefly by lodgepole pine. Much of the west slope on lower levels is covered with deciduous growth in which aspen predominates.

North of this great burn as higher altitude is reached the road enters the third forest type, that of Englemann spruce. Here alpine fir becomes more conspicuous, precipitation is greater and swamps, muskegs, and spring creeks numerous. The forest floor and the older fallen trees are deeply covered in moss; there is an underbrush of *Vaccinium*, *Lonicera*, *Menziesia*, *Viburnum*, and *Salix*. This condition, modified to some extent by areas of lodgepole pine reproduction on old burns, prevails to the boundary of the park. Altitudinally above the lodgepole pine and Englemann spruce forest types is a fourth type dominated by alpine fir.

Modification of Environment

There can be no doubt that modification of forest type by fire has affected the distribution of birds and mammals. It can be conjectured that after fire had swept up the valleys and one floral type was replaced by another, certain animal species found conditions unsuitable and their numbers were reduced, while other more highly specialized species disappeared entirely. Following this a different aggregation of animals impelled by population pressure elsewhere moved in and eventually a different biota was established. As burned-over areas again became reforested the process was reversed.

We are indebted to Mr. George Hopping for some historical data pertaining to this subject.

> "Starting a few miles south of Nixon Creek, there is a scar caused by a fire in the summer of 1917. This extends southward beyond the park boundary. It has been naturally reforested by lodgepole pine with a small percentage of spruce. From the edge of this fire scar northward to Dolly Varden Creek there is a mature stand (now mostly dead) of lodgepole pine with two distinct age classes. These were undoubtedly caused by successive fires. The first one occurred about 1800 and gave rise to an even-aged stand now 130 to 140 years old. This extends from south of Nixon Creek to a point two miles north of McLeod Meadow.
>
> "Another fire which occurred about 1320 burned from this point northward causing an even-aged stand 110 to 120 years old extending to Dolly Varden Creek. A third fire burned from Dolly Varden Creek northward about 1870 giving rise to another even-aged stand 60 to 70 years old extending to Kootenay Crossing. Finally, a fire occurred in 1926 which burned from Kootenay crossing northward to Wardle Creek up Vermilion River and north-westward up the Kootenay Valley beyond the park boundary."

While the changes in biota brought about by ancient fires can not now be demonstrated nevertheless several major fires, the last in 1926, have exerted an influence on animal life that is clearly apparent. An area of some 27 square miles of Englemann spruce and lodgepole pine forest has been replaced by an open range type of habitat upon which grasses, aspens, and various shrub species, used as browse by members of the deer family, have become established during the process of coniferous reforestation. The present status of these animals is considered elsewhere in this report and it is necessary here to mention only that their increase has been conspicuous. Not so apparent, however, are the changes in bird life brought about through this change in environment. Thus such birds as Franklin grouse, olive-sided flycatcher, Canada jay, winter wren, golden-crowned kinglet, and olive-backed thrush have disappeared and an

entirely different type of bird life is in process of establishment. It has become a centre of abundance and distribution for Columbian ground squirrels while most of the forest-dwelling mammals have disappeared.

Another factor that is creating a changed environment is the current infestation of lodgepole pine by bark beetles. The total extent of the infected areas has not been measured but it is very large and in some stands most of the mature trees are dead as a result. Undoubtedly this will have far-reaching effects on the biota. In reference to this condition Mr. Hopping informs us that:

> "The present outbreak started about 1929 at the extreme southern end of the area near Pitts Creek. This is in the oldest stand of pine. By 1937 over 80% of the timber had been killed in this stand south of McLeod Meadow and between 40 and 50% north of this point. Up to 1938 the 110-120 year old stand had suffered less than 10% mortality. In 1939 and 1940 however, a sharp increase occurred in this zone and by 1941 three plots located here had a mortality of 46, 68, and 79% respectively, increasing from south to north. Thus the active centre of infestation has followed the same progression as the fires which gave rise to the different age classes. At the present time the centre of infestation is in the northern end of the 110 to 120 age class and is passing into the zone with the 60 to 70 year old trees."

Life Zone Classification

In preparing a review of the avi-fauna and life zone classification of British Columbia we have deemed it advisable to recognize 13 terrestrial and 2 marine biotic areas designated as follows: Osooyos-arid, Dry Forest, Cariboo Parklands, Columbia Forest, Subalpine Forest, Coast Forest, Boreal Forest, Peace River Parklands, Southern Alplands, Northern Alplands, Puget Sound Lowlands, Gulf Islands, Queen Charlotte Islands, Coast Littoral, and Pelagic Waters.

We have regarded three criteria as evidence for identifying a biotic area, namely, the presence of distinctive plant species, the presence of distinctive animal species, and the absence of species, both plant and animal, that are conspicuous in adjacent areas.

Considered on the basis of this formula two biotic areas, each typical in its manifestations, and a third area, less readily identified, are represented in Kootenay National Park. The two of typical character are the Sub-alpine Forest and the Southern Alplands. The third, occupying the lower altitudes from the neighborhood of Kootenay Crossing to the southern park boundary, exhibits floral and faunal characteristics common to both the Sub-alpine and the Dry Forest and is a broad area of transition between these two biotic areas.

The Sub-alpine Forest biotic area occupies a zone between approximately 4,000 and 6,500 feet altitude, in other words it is a forest belt between the intermediate area and the Southern Alplands biotic area. The forest is almost exclusively coniferous with Englemann spruce the dominant over the lower two-thirds and alpine fir the dominant over the upper third of this altitudinal range. The precipitation is relatively high and winter temperature low; no precise figures are available.

Birds restricted to this biotic area are: hudsonian chickadee, hermit thrush, bohemian waxwing, Tennessee warbler, and Lincoln sparrow.

The marten is more common here than elsewhere and it is the chief range for wolverine but apparently all the larger mammals found here occur also below the altitudinal boundaries of this biotic area. Lemming vole and Richardson vole, neither of which was recorded, undoubtedly are present and probably do not appear at lower altitudes. Common small mammals are cinereous shrew, dusky shrew, golden-mantled ground squirrel, Columbian ground squirrel, chipmunk, red squirrel, white-footed mouse, red-backed mouse, meadow vole, long-tailed vole, and jumping mouse.

The Southern Alplands biotic area consists of the alps, the high meadows, and summit country generally, above timber line. No information is available in reference to the status of birds and mammals in these portions of the park but it can be inferred that hoary marmot, pika, lemming vole, Richardson vole, white-tailed ptarmigan, golden eagle, pipit, and grey-crowned rosy finch are established there. The least chipmunk, abundant in this biotic area right up to the Alberta boundary line, will also be present.

The territory referred to as transitional between the Sub-alpine and Dry Forest biotic areas merges imperceptibly along its higher

margins into the former. So also elements of the latter become more manifest toward the south boundary of the park. Nowhere, however, is it typical of the Dry Forest biotic area which is characterized by a yellow pine — Douglas fir association. The former does not enter the park; the latter is not found in stands of any great extent. A small stand of western larch is established in this area adjacent to Settler's road. Floristicly this intermediate territory cannot be classified with precision but as its fauna contains many elements associated with the Dry Forest it seems best to include it in this biotic area. The precipitation is less, the temperature higher, and in general climatic conditions are drier, in comparison with the Sub-alpine Forest biotic area.

Birds found here more or less commonly and absent or casual elsewhere within the park are: red-shafted flicker, yellow-bellied sapsucker, hairy woodpecker, Wright flycatcher, mountain bluebird, red-eyed vireo, yellowthroat, and western tanager.

Little is known of the small mammals inhabiting this transitional territory. There is evidence of the occurrence of skunk, badger, barred bobcat, and muskrat all of which are representative species of the Dry Forest biotic area.

Vertebrate Habitats

The study of vertebrate habitats no doubt will be a major objective in any plan for future faunal investigations in the park. It is to be emphasized that our survey was preliminary in scope and intensive work was not attempted. However certain primary habitats are conspicuous and can be discussed here summarily. These might be placed in two groups, namely (1) those in which water in one form or another is a controlling factor in development of the flora and the establishment of an animal population, and (2) land areas in which water is not a controlling factor. The first group includes river and river-edge, meadow-streams, forest-streams and swamps, mountain-streams, willow swamp and *Carex* meadow, lakes and ponds. The second embraces lodgepole pine and Douglas fir forest, lodgepole pine forest, Englemann spruce forest, deciduous woodlands, roadside and camp clearings, the burns, the slides.

River and river-edge. The river system is of first importance and its history from ancient times undoubtedly has been interwoven with the history of the biota. From a remote past rivers have been the dominant force in establishing the physiography of the park, carving the valleys, leaving a residue of silt that was to act as a basis for all growth and serving as the great artery of drainage. All the glacial-born streams, the brooks and rills that carry off the melted snow, all the springs, creeks, and ponds drain into the river system of the Kootenay and Vermilion. The river system provided a highway for the movement of animal populations that, as conditions grew suitable for them, advanced along its course and became established. Now, as in the past, the river system is the central fact of greatest importance. Along it wapiti and other members of the deer family first entered the district and to-day along its course they advance in spring behind the melting snows and retreat before the onset of winter. In summer it is a potent force in the life of these animals; they browse close to its shores and cross from one side to the other — their day by day movements are inscribed on the sands and mud of its beaches. It ensures shelter and food for mink, and beaver build their dams in its back waters and at the mouths of its tributaries. Marten travel the forest trails that follow its course and in its undercut banks are well-beaten runways used by smaller mammals of various kinds. Spotted sandpipers nest along its margin; belted kingfishers and rough-winged swallows nest in its banks and its riparian thickets are populated by various flycatchers, warblers, and other brush-loving birds and finally it provides a highway of bird migration from the Great Basin of the Interior Plateau.

Meadow-streams. The type of stream referred to here is one of small proportions that drains swampy, open ground dominated by *Carex*. In such places the jumping mouse and meadow vole are the most abundant small mammals and weasels travel the stream banks in their pursuit. The frequency of such meadow-streams in the park was not determined.

Forest-streams and swamps. A densely populated community centres about areas of wooded, swampy tracts in the Sub-alpine forest. Usually these are drained by small rills that empty into an adjacent forest stream. The lowest portions support grasses of various kinds; the drier places are covered deep

in moss as are the prostrate tree trunks. Conspicuous among the flowering plants are *Calypso borealis, Cyripedium Calceolus* var. *pubescens, Orchis rotundifolia, Pinguicula vulgaris, Primula Maccalliana* and *Ledum groenlandicum*. Higher knolls are covered with a shrubbery in which *Vaccinium ovalifolium, Rhododendron albiflorum* and *Menziesia ferruginea* usually are included. Englemann spruce and alpine fir are dominant, the trees wider spaced and usually smaller on the wet portions than on the surrounding higher ground. Cinereus shrew, meadow vole, long-tailed vole, and red-backed mouse are the commonest small mammals; hermit thrush, varied thrush, ruby-crowned kinglet, and Tennessee warbler are the commonest birds.

Mountain-streams. The alpine rills that form the headwaters of larger streams flow through all the varied habitats of the alplands. Now cataracts tumbling down precipitous cliffs and gurgling out of sight beneath the broken talus they emerge for a time onto the wet meadows of high altitudes. Here their banks are carpeted with the varied flora of that altitude, *Saxifraga nivalis, Parnassia montanensis, Trollius laxus* and *Anemone occidentalis* being prominent where drainage is fair while the more constantly moist reaches support a dense growth of sedges (*Carex Mertensii* and *C. nigricans*) with the white tufts of the cotton grass *Eriophorum callitrix* and the short spires of *Tofieldia glutinosa* silvering broad stretches that in midsummer show purple in the distance as the richly coloured heads of *Pedicularis contorta* burst into flower. Lower still, willows dominate the riparian flora with the silvery foliage and two-inch catkins of *Salix Barrattiana* most conspicuous.

Few animals have adapted themselves to life under the rigors of alpland climate. Lemming vole and Richardson vole are characteristic while meadow vole and jumping mouse range up from lower altitudes.

Willow swamp and Carex meadow. Habitat of this type is prevalent in the valley of Dolly Varden Creek and probably in other narrow valleys of the same kind. This is a fairly large stream containing a fish population so that it attracts mink and the occurrence of otter has been reported. It supports several families of beaver and is a nesting ground for mallard. The willow thickets are frequented by yellow-throats.

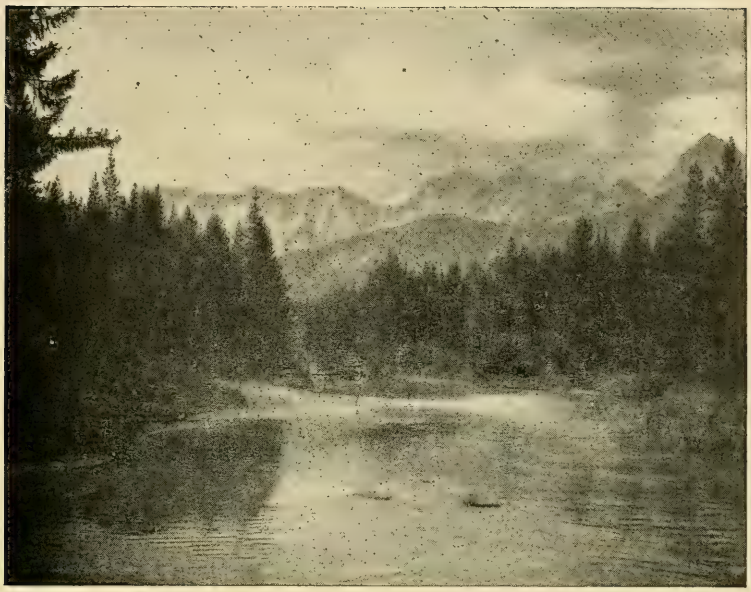
Lakes and ponds. Olive Lake on the Sinclair Summit and a small forest pond south of Vermilion Crossing were the only waters of this type visited. So far as could be learned neither has exerted any marked influence on the biota. Dog Lake, east af McLeod Meadows, is reported to be a nesting ground for loons; this and other lakes in the park require investigation.

Lodgepole pine and Douglas fir forest. Forest of this type examined is confined to the more arid slopes adjacent to Sinclair Canyon. Beneath the open stand of Douglas fir and lodgepole pine a varied shrub-flora includes aspen, buffalo berry, service berry, choke cherry, dogwood, rose, and buck brush *Ceanothus* sp. *Juniperus communis and J. scopulorum* are both common. Forbs are scarce and grasses dominate the herbaceous vegetation.

Tanagers, pine siskins, and Audubon warblers are abundant, Cassin finch, white-crowned sparrow, and blue grouse are less common but characteristic. It is year-round range for mule deer and some sheep and a much larger population of both species utilize it as winter range.

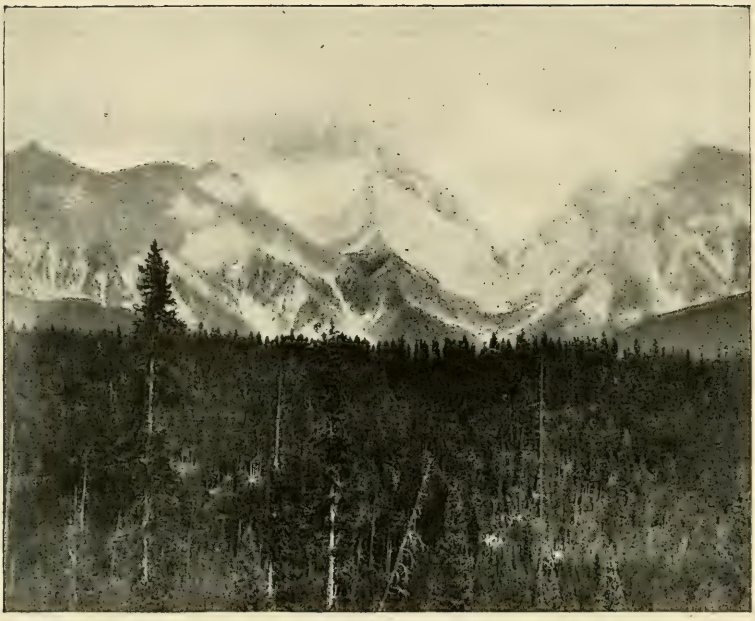
Lodgepole pine forest. Tracts of almost pure lodgepole pine are not infrequent. Such are fairly open with an attendant flora dominated by grasses. Common birds here are American three-toed woodpecker, Hammond flycatcher, olive-sided flycatcher, American robin, red-breasted nuthatch, mountain chickadee, Audubon warbler, and Oregon junco. Less abundant and near the limit of their altitudinal range are red-shafted flicker, western wood peewee, and western tanager. It is summer range for mule deer and white-tailed deer. No information was obtained regarding the small mammal population.

Englemann spruce forest. The forest floor is rough with much fallen timber and underbrush. Marten are abundant, red squirrels commoner than elsewhere; moose and mule deer are plentiful, wapiti and white-tailed deer much less so. The small mammal population includes dusky shrew, phenacomys, red-backed mouse, meadow vole, and white-footed mouse. Bird life is not so plentiful as in the forests at lower altitudes; American three-toed woodpecker, olive-sided flycatcher, Canada jay, hudsonian chickadee, red-breasted nuthatch, olive-backed thrush, and evening grosbeak are characteristic species.



Kootenay River near McLeod Meadows, Kootenay National Park, B. C.

Bridge at Kootenay River Crossing, Kootenay National Park, B. C.



Range near Kootenay Crossing, Kootenay National Park, B. C.

Olive Lake, Kootenay National Park, B. C.

Deciduous woodlands. In the Kootenay Valley clear stands of tall aspens and black cottonwood are established in breaks in the lodgepole pine forest and along streams. These provide nesting sites for red-shafted flicker, yellow-bellied sapsucker, and hairy woodpecker. Warbling vireo is another species characteristic of this type of woodland. Apparently no mammals are peculiar to it.

Roadways and camp clearings. Openings in the coniferous forest such as the roadways and camp-grounds attract various mammals and numerous species of birds. Black bear travel the roads and eat the new grass and *Equisetum* along their margins; camp clearings with their abundant pasture also are favorite feeding grounds. For members of the deer family the roads provide easy passage from one feeding ground to another and are used regularly for this purpose. Chipmunks appear to be more numerous here than in the forest; Columbian ground squirrels are common and golden-mantled ground squirrels have taken possession of several camp clearings; snowshoe rabbits, usually hard to detect in the woods, frequently are seen by the roadside.

Such openings have permitted the added growth of aspen, alder and shrubbery; while various plants of forage value such as clover and dandelion have been introduced with perhaps not insignificant effect on animal life. Thus clover provides additional food for rabbits and for grouse; pine siskins seek the dandelion seeds and deer feed on the roadside browse.

American robin, chipping sparrow and Oregon junco have populated these open places and Townsend solitaire, rough-winged swallow and cliff swallow find nesting sites in the cut-banks. All these are conspicuous to the traveller along the road. Finally the open areas provide opportunities to view nighthawks, black swifts and swallows in flight over the tree tops.

The burns. Extensive areas in the park have been burned over in recent times and for a while following the fire these were zoological deserts. Now they are being reclaimed rapidly by vegetation and are in process of colonization by various kinds of animals. For some bird species the clearing away of the forest by fire meant that additional territory near the periphery of their altitudinal range became available. Red-shafted flicker, mountain bluebird, and tree swallow are species so affected and probably these now find the limit of their altitudinal distribution in the park in the marginal territory provided by the burn that extends for six miles or so south of Wardle Creek. For other species whose distribution is not greatly modified by altitude the burned-over areas are not marginal territory but additional favourable habitat. Thus such ground-nesting birds as Oregon junco and white-crowned sparrow are established there and the change in environment also favoured an increase of Townsend solitaire. It is a hunting ground for red-tailed hawk that probably feed on Columbian ground squirrels for which the burn is a centre of distribution for the whole park. Finally the new supply of browse provides abundant food for members of the deer family so that the burns are summer range of first importance.

The slides. The west side of the Vermilion Range is notable for the series of extensive slides that cut through the forest from timber line to the valley bottom. Above are the high bare escarpments, some almost sheer, of the mountain ridge. South of Vermilion Crossing the base of one slide reaches the highway, its apex being at the mouth of a narrow, steeply-sloping valley several thousand feet above. The greater part is covered with mountain alder, the more open lower slope by dwarf birch, small aspen, highbush cranberry, service berry, and wild rose. Macgillivray warbler, Wilson warbler, Lincoln sparrow and fox sparrow were found in this particular slide and these no doubt are characteristic species of this habitat elsewhere. It was observed also that the lower levels were cut up by trails of moose and wapiti and that the brush had been extensively eaten by these animals.

BIRDS

The spring bird migration was nearly over when observations commenced at Vermilion Crossing on June 8. On this date and subsequently until June 13 numbers of olive-backed thrushes continued to pass through and on the latter date the first Tennessee warbler was recorded. Apparently all other summer visitants with the exception of nighthawk had arrived and this species first appeared on June 24. Townsend warbler, Macgillivray warbler and chipping sparrow were on their nesting territorities and in full song; other species that had arrived earlier, for example Amer-

ican robin, Audubon warbler, and western wood peewee, were in a later stage of the nesting cycle, and such resident species as three-toed woodpecker, hairy woodpecker, and dipper were incubating or feeding young in the nest.

The bird life of Kootenay National Park is more varied than is usually the case in the heavily forested regions of British Columbia and in comparison with those of the Selkirk Mountain region the population is more dense. This variety and relative density of population is most apparent in the woods bordering clearings such as are provided by the burns, roadways and camp-grounds and in portions of the semi-open, lodgepole pine forest. In addition to the species normally to be expected in such places the population includes others to whom the region is near the limit of toleration. In this category are included red-shafted flicker, yellow-bellied sapsucker, alder flycatcher, Wright flycatcher, western wood peewee, mountain bluebird, tree swallow, rough-wingd swallow, cowbird, and western tanager.

The comparative accessibility of the region, its connection with a broad highway of migration, the fact that important modification of habitat is in process plus the dynamic of population pressure explain this infusion of bird species characteristic of lower altitudes. Undoubtedly changes in the constituents of the population in this marginal territory will continue. It will be unstable; there will occur an ebb and flow in harmony with the processes of population pressure elsewhere so that species present one year may be absent the next or the reverse of this will take place.

The birds of the Sub-alpine Forest, beyond the limits of such infusion, are those characteristic of this biotic area in southern British Columbia. Two exceptions were noted, namely, Tennessee warbler and bohemian waxwing — species that elsewhere in the Province occur in higher latitudes.

The following list of birds comprises 79 species of which 69 were observed by us. The remainder, 10 species, are included on the basis of satisfactory evidence submitted by park wardens.

Loon. *Gavia immer.*- Reported to occur each summer on Dog Lake which lies on the east side of the Kootenay River east of McLeod Meadows. Four were seen there in May, 1943. (Thompson).

Canada Goose. *Branta canadensis.*- Seen fairly regularly on migration (Thompson).

Snow Goose. *Chen hyperborea.*- On an evening in the autumn of 1941 a large flock was seen in flight near Kootenay Landing (Thompson).

Mallard. *Anas platyrhynchos.*- Occurs on migration and nests in the meadows along Dolly Varden Creek where broods of young have been met with (Thompson).

Barrow Golden-eye. *Glaucionetta islandica.*- Two pairs observed on a small lake about three miles north of Kootenay Crossing, April 29, 1943.

Harlequin Duck. *Histrionicus histrionicus.*- Observed on Tokumm Creek and on Sinclair Creek (Meredith).

Goshawk. *Astur atricapillus.*- An adult male seen flying across the highway near Marble Canyon on June 25. Meredith reports seeing an adult kill a ruffed grouse in the winter of 1942-43.

Sharp-shinned Hawk. *Accipiter velox.*- One seen on June 21 flying through the woods in Sinclair Canyon.

Red-tailed Hawk. *Buteo borealis.*- The red-tailed hawk was observed on three occasions and undoubtedly nests in the park. An old stick nest in a tall lodgepole pine at Dolly Varden Creek was thought to be of this species.

Golden Eagle. *Aquila chrysaëtos.*- Said to nest on Wardle Mountain. In the spring of 1943 five were seen feeding on an elk carcass near Kootenay Crossing (Thompson).

Sparrow Hawk. *Falco sparverius.*- One heard at Kootenay Crossing on June 14, another pair apparently nesting on the flats adjacent to Settler's road on June 28.

Blue Grouse. *Dendragapus obscurus.*- Reported as common on the open side hills along the upper Kootenay Valley (Thompson). Three adult males seen on the west slope of Mount Berland, north of Radium on June 24, 1943.

Franklin Grouse. *Canachites franklini.*- On June 27 an adult male was flushed in a dense swamp. It flew into a small spruce and alighted on a branch about 10 feet from the ground. Here it turned so that it was parallel with the branch on which it stood and displayed, wings slightly drooped, the tail expanded and at right angles to the back. This was the only

specimen met with but droppings were noticed in various places. Meredith and Thompson consider it to be the commonest grouse in the park. The remarks in reference to possible predation on the ruffed grouse by marten are applicable here also.

Ruffed Grouse. *Bonasa umbellus.*- Not common in 1943. Two flushed in open woods bordering a beaver meadow in Dolly Varden Creek Valley, June 14, a female with small brood observed on June 25, and a male and two females with downy chicks seen on John McKay Creek on June 27 represented the total records. However Thompson reports a recent increase in population.

There are no figures in reference to the cyclic curve of population as it may operate in the park. Apart from this there may be a co-relation between the present scarcity of grouse and the present abundance of marten. To what extent grouse enter into the diet of marten is not known but presumably such predation occurs and the extent of the pressure may in turn be related to the population cycle in mice, a staple food of marten. Study of this problem would be of economic importance.

White-tailed Ptarmigan. *Lagopus leucurus.*- Observed in 1938 on Wolverine Pass (Meredith) and at Luxor Pass and above Floe Lake (Rutherford).

Spotted Sandpiper. *Actitis macularia.*- One seen on the Kootenay River near Kootenay Crossing on June 18, five others noted at various points along the upper reaches of Tokumm Creek on June 25.

Horned Owl. *Bubo virginianus.*- Reported to be resident in the park. One seen by Meredith flying across the highway near Hawk Creek in June, 1943.

Nighthawk. *Chordeiles minor.*- Established as a summer visitant in the open region of the park from Kootenay Crossing south. First seen June 24 (Thompson).

Black Swift. *Nephoecetes niger.*- A pair was observed on the evening of June 24 and again on June 27 at Vermilion Crossing.

Rufous Hummingbird. *Selasphorus rufus.*- One seen at Vermilion Crossing on June 12; a female near the same place on June 16 acted in the manner of a nesting bird. Noted also at Kootenay Crossing on June 18 and on John McKay Creek on June 27.

Belted Kingfisher. *Megaceryle alcyon.*- Nests along the Kootenay River where one was seen on June 14 and a nest was located in a clay and sand cliff in this vicinity 10 days later. Thompson notes it as a regular summer visitant.

Red-shafted Flicker. *Colaptes cafer.*- One pair observed near Rocky Mountain bungalow camp, June 25; another about a mile south of this point, June 29, were evidently nesting. A third pair nested on a dead fir stub in the horse pasture at Kootenay Crossing. This tree was felled on June 16 and four of the eight young in the nest were killed. Part of the shell of the tree broke off exposing the upper part of the nest cavity and the workmen had covered the gap with a piece of bark. When the nest was examined on June 18 the four young were active and their bellies were tight with food. It seemed clear that the young were being fed even under these unusual circumstances. Neither of the parents appeared but one was heard calling from the edge of the forest a short distance away.

Pileated Woodpecker. *Ceophloeus pileatus.*- Reported from Nixon Creek by G. Hopping and from Sinclair Summit by W. B. Johnstone. Noted also at Kootenay Crossing by Thompson. Two seen on Tokumm Creek, June 25, and on June 29 single birds were observed at John McKay Creek and at McLeod Meadows.

Yellow-bellied Sapsucker. *Sphyrapicus varius.*- Apparently not common. Observed at Kootenay Crossing and south of this point. A male collected on June 28 had eaten five carpenter ants, *Camponotus* sp., seven smaller ants of a different species, and two adult Clark beetles, *Ips.* sp.

Hairy Woodpecker. *Dryobates villosus.*- Associated with the aspen and cottonwood stands from Kootenay Crossing south; none seen north of this point. One nest 20 feet from the ground at Rocky Mountain bungalow camp, discovered by Mr. Hopping, contained large young on June 14. These were being fed by the female. Several old nest cavities in cottonwood trees near Dolly Varden Creek were probably made by this species. An adult male collected near Kootenay Crossing on June 14 had eaten 11 carpenter ants and one Cerambycid beetle; a juvenile male taken near the same place on June 28 had eaten thirteen carpenter ants and two adult Cerambycid beetles, *Spondylus upiformis.*

Arctic Three-toed Woodpecker. *Picoides arcticus.*- On June 9 two were seen along the highway between Dolly Varden Creek and Kootnay Crossing.

Three-toed Woodpecker. *Picoides tridactylus.*- The most common woodpecker in the park. It was thought possible that the invasion of the lodgepole pine stands by bark beetles *Dendroctonus* sps. might have a tendency to increase the woodpecker population in the infected areas but this cannot be determined because nothing is known of the species' status there before the outbreak occurred. At the present time the woodpecker population does not appear to be larger in the lodgepole pine areas of high infection than it is in the spruce dominated areas that contain only a relatively small number of infected pines. Scattered here and there through both forest types are pines that three-toed woodpeckers have worked over but such trees do not appear to be more common in areas of high infection than they are elsewhere.

The woodpeckers when working on an infected tree systematically scale off the bark to the cambium layer. Such trees denuded thus of their bark show the channels cut in the cambium surface by the bark beetle larvae. In some observed instances the bark had been removed from the entire circumference of the tree for a distance of 30 feet or more above the ground. In others the birds had worked on one side of the tree only.

Only one of the five specimens collected contained bark beetles; this bird had eaten nine *Dendroctonus monticola* larvae. Cerambycidae larvae were present in the stomachs of all five, and Bupestridae larvae in two. One bird had taken three *Cucujus clavipes* larvae; another had eaten three carpenter ants; two had eaten larval Cleridae and two contained spiders.

During the time we spent in the park most of the three-toed woodpeckers were feeding young in the nest or so it semed from their behaviour. Several times one was detected flying straight away through the trees apparently making directly for its nest.

From near the top of a tall tree on the nesting territory, and invariably concealed by the trees' thick foliage, one or another of a pair performed the rolling call characteristic of woodpeckers in the nesting season. This was repeated at rather long intervals. In volume the sound seemed somewhat less than that made by the yellow-bellied sapsucker. They became excited when the nesting territory was approached and flew from one tree to another calling repeatedly and acting generally in a fearless and conspicuous manner, the reverse of their habit at other times. A male under observation on June 10 travelled up a tree trunk in a succession of hops; his yellow crown feathers were erected and he gave a chattering call at short intervals.

A recent nest cavity excavated in a live lodgepole pine about four feet from the ground had been attacked, apparently by a bear. The surface of the tree for six inches or so around the entrance was chewed away to a depth of an inch below the bark and tooth marks of the animal responsible were plainly visible in the wood. The nest was deserted.

Alder Flycatcher. *Empidonax trailli.* - Considered to be the least common flycatcher in the park. One was identified, on the basis of voice, at Kootenay Crossing on June 14.

Hammond Flycatcher. *Empidonax hammondi.*- This was the commonest flycatcher; met with in many localities from the Sinclair Summit to Marble Canyon.

Wright Flycatcher. *Empidonax wrighti.*- Included on the basis of voice identification. Specimens were not obtained. It appears to be much less abundant than Hammond flycatcher and the few seen and heard were in brushy thickets along Dolly Varden Creek.

Western wood peewee. *Myochanes richardsoni.* Seen on several occasions at Kootenay Crossing and in the open territory to the north. A female taken on June 19 was in breeding condition.

Olive-sided Flycatcher. *Nuttallornis mesoleucus* The first was heard on June 13, subsequently it became common and was recorded from various places along the highway between Vermilion Crossing and Vermilion Pass.

Violet-green Swallow. *Tachycineta thalassina.* Amongst a small number of white-bellied swallows flying over the big burn on June 24 one at least was identified satisfactorily as this species.

Tree Swallow. *Iridoprocne bicolor.*- Several pairs seen on two occasions in the big burn were evidently nesting in old tree stubs that stand on the rough slope above the river.

Rough-winged Swallow. *Stelgidopteryx ruficollis.*- Approximately six pairs nested in a bank beside the road near Kootenay Crossing; others were seen in similar places between that point and the Sinclair Summit.

Cliff Swallow. *Petrochelidon albifrons.* - On June 24 a pair was seen flying about a hard sand-cliff near the big burn and it was assumed that they were nesting there.

Canada Jay. *Perisoreus canadensis.* - Small bands of Canada jays composed of adults and young were met with at various places between Dolly Varden Creek and Marble Canyon.

Steller Jay. *Cyanocitta stelleri.* - Thompson informed us that one wintered at Kootenay Crossing 1942-43 and Rutherford reports seeing it occasionally on Sinclair Summit.

Magpie. *Pica pica.* - Meredith and Thompson report seeing magpies occasionally in spring at Kootenay Crossing and state that formerly they occurred more regularly. Apparently a number were killed by the wardens some years ago and in recent years they have been decidedly scarce. Possibly at one time magpies nested in the park but apparently none does so now. On June 27 the wing of a magpie was picked up on the timbered slope north of Radium.

Raven. *Corvus corax.* - Several wintered in 1942-43 at Kootenay Crossing (Thompson). Seen in Lower Kootenay Valley, January, 1943 (Rutherford).

American Crow. *Corvus brachyrhynchos.*- Observed in the spring of 1942 and 1943 at Radium (Meredith) and reported as casual at Kootenay Crossing (Thompson). Not known to nest within the park but three seen at Radium on June 29 may have been nesting locally. It is significant to note that crows were first noted in the park in the spring subsequent to the epidemic in the Sinclair Canyon sheep band. The abundant carrion may well have been responsible.

Clarke Nutcracker. *Nucifraga columbiana.* - A pair with full-grown young were seen near Rocky Mountain bungalow camp June 18 and subsequently others were seen on Wardle Mountain. Thompson reports it at Marble Canyon and at other points in winter.

Black-capped Chickadee. *Penthestes atricapillus.*- A pair of these birds answered an owl call on Tokumm Creek on June 25.

Mountain Chickadee. *Penthestes gambeli.*- Seen only once, in the pine woods near Rocky Mountain bungalow camp, but the species is probably more plentiful than this lack of records would indicate.

Hudsonian Chickadee. *Penthestes hudsonicus.*- Pairs observed several times in the thick spruce woods where nesting was evidently in progress.

Red-breasted Nuthatch. *Sitta canadensis.* - Occurs in all forest types throughout the park.

Dipper. *Cinclus mexicanus.*- Heard on the Vermilion River near Vermilion Crossing and reported from Marble Canyon by Thompson. A single bird seen on Tokumm Creek on June 25. On June 29 a young bird with the slightly-spotted, light-coloured breast of the first plumage was observed at close range on Sinclair Creek close to Radium Hot Springs.

Winter Wren. *Nannus hiemalis.*- This species is subject to noticeable fluctuations in numbers of population. In 1943 it appeared to be scarce as only four birds were recorded, - one at Vermilion Crossing where it was heard on June 10 and again on June 11, three others in the heavy timber bordering Tokumm Creek.

American Robin. *Turdus migratorius.*- One of the commonest birds of the park observed along the road from Sinclair Canyon to Vermilion Pass and at numerous places inside the forest.

Varied Thrush. *Ixoreus naevius.* - Pairs or single birds were seen or heard from Sinclair Summit to Tokumm Creek. A pair observed up Tokumm Creek on June 25 was feeding young in the nest.

Hermit Thrush. *Hylocichla guttata.*- The song of the hermit was not heard anywhere in the forests at lower elevations, nor were any birds seen there. It was observed in several places at higher altitudes along Tokumm Creek and probably is the common Hylocichline thrush in the sparsely-timbered upper section of the Sub-alpine Forest biotic area.

Olive-backed Thrush. *Hylocichla ustulata.*- Numerous transients were recorded at Vermilion Crossing June 9-June 13, while at the same time pairs in the early stages of the nesting cycle were established on their territories, and males were in full song. During the following week several females were captured accidentally in traps set for mice; each of these had brood patches.

What was identified as an old nest of the species had been built 10 feet from the ground in a small spruce. The nest foundation included dry *Equisetum*, moss, and other plant material; the rim was fine grass exclusively and the lining fine grass mixed with moose hair.

Mountain Bluebird. *Sialia currucoides.*- Fairly common in open situations in the Kootenay Valley and one was seen three miles south of Vermilion Crossing on June 17. Several pairs nested in the big burn and another occupied a bird house at the Rocky Mountain bungalow camp.

Townsend Solitaire. *Myadestes townsendi.*- Seen regularly along the highway between Sinclair Canyon and Vermilion Crossing and in the open territory of the burns. Apparently it was nesting in cut-banks beside the road and in similar places in the burned-over areas.

Golden-crowned Kinglet. *Regulus satrapa.*- In the early part of June golden-crowned kinglets were detected several times among a drifting population of small birds that kept high up in the spruce trees. On June 25 several pairs were seen in the open spruce woods bordering Tokumm Creek. Very likely it is a fairly common summer visitant to the Subalpine Forest biotic area.

Ruby-crowned Kinglet. *Corthylio calendula.*- Not particularly common. A male sang frequently from a particular point in the woods near the warden's cabin at Vermilion Crossing and the song was heard in other places south to Kootenay Crossing.

Bohemian Waxwing. *Bombycilla garrula.*- A pair, evidently nesting, was observed at the edge of a clearing near Kootenay Crossing, June 19, and another pair in thick woods at Vermilion Crossing, June 23, 24. Very likely it is distributed in summer throughout the alpine forests as it is in adjacent regions on the east slope of the Rocky Mountains.

Solitary Vireo. *Vireo solitarius.*- A single singing male seen at John McKay Creek on June 27 constitutes our only record.

Red-eyed Vireo. *Vireo olivaceus.*- Three were noted on June 27 in the dense deciduous growth bordering John McKay Creek.

Warbling Vireo. *Vireo gilvus.*- On June 10 two were seen at the edge of the Vermilion Crossing camp ground and on June 14 its unmistakeable song was heard in several places where aspens and cottonwoods predominate, near Dolly Varden Creek. Seen also at John McKay Creek in a similar environment.

Tennessee Warbler. *Vermivora peregrina.*- Common in the spruce woods where the song was first heard on June 13. The slight, sibilant song comes usually from the thickly-foliaged upper portion of a spruce where the singer is hard to detect.

Audubon Warbler. *Dendroica auduboni.*- This is the commonest warbler in the park and from the time of our arrival the males were heard singing in various types of wooded habitat. Males were seen also flying out from a tree in pursuit of passing insects in the manner so characteristic of this warbler. The females, that were incubating at this time, were less in evidence.

Townsend Warbler. *Dendroica townsendi.*- Satisfactory identification of this warbler, by song or by sight, was made a number of times between June 10 and June 24 in the vicinity of Vermilion Crossing. Several others were seen on June 25 along Tokumm Creek. There were numerous occasions also when an instant glimpse of a small warbler in the tall spruces was insufficient grounds for its identification but many such were probably this species.

Macgillivray Warbler. *Oporornis tolmiei.*- A transient appeared in a brushy thicket at Vermilion Crossing on June 12 and on June 25 a singing male was taken in shrubbery near the foot of a slide. Up Tokumm Creek on June 25 this warbler was found to be fairly common in the tangled, deciduous vegetation of the slides.

Yellow-throat. *Geothlypis trichas.*- Two males of this species were observed at close range in a flooded willow swamp on Dolly Varden Creek, June 14.

Wilson Warbler. *Wilsonia pusilla.*- Seen at Kootenay Crossing on June 18 and June 22. Very likely further investigation will show this to be of regular distribution in brushy thickets and aspen woods throughout the park.

American Redstart. *Setophaga ruticilla.*- A female was taken at Vermilion Crossing on June 10; this was the only specimen seen.

Western Meadowlark. *Sturnella neglecta.*- Included in the park's fauna on the authority of Warden Rutherford who stated that in April, 1937, one settled on a bare piece of

ground close to the cabin at Marble Canyon and remained in the vicinity for two days thereafter.

Cowbird. *Molothrus ater.* - Several seen accompanying horses in the pasture at Kootenay Crossing during the early summer of 1943 (Thompson).

Western Tanager. *Piranga ludoviciana.*- In Kootenay Park the western tanager is near its westerly limit of distribution and is not common. A singing male seen at Rocky Mountain bungalow camp, June 14-21, evidently represented a nesting pair. Another singing male was observed in the spruces at Vermilion Crossing June 24 and a pair in the trees beside the moose lick about six miles south on June 27. At the lower elevations adjacent to Radium it was more abundant and several were seen there on June 27 and 29.

Evening Grosbeak. *Hesperiphona vespertina.*- Several times at Vermilion Crossing the presence of small wandering bands was announced by their loud whistled calls. They would alight near the tops of the tallest trees to remain only a short time before taking flight again. Thus on June 12 a flock of five appeared and on June 19 two males and two females together visited the same group of trees. Later in the day a flock of six was seen in flight near Dolly Varden Creek and on June 24 a mated pair was in the trees at the edge of the moose lick.

Cassin Purple Finch. *Carpodacus cassini.*- On June 29 an adult male was seen on the roof of the gateway building at Radium Hot Springs.

Pine Siskin. *Spinus pinus.*- Common in flocks of five or six in the woods, and the open places as well, from Sinclair Canyon to Vermilion Crossing. One such flock frequently appeared on the lawn at Vermilion Crossing bungalow camp.

Red Crossbill. *Loxia curvirostra.*- Crossbills are highly erratic in local distribution and in the summer of 1943 were found to be scarce throughout the southern Rocky Mountain area. The only individuals seen in Kootenay Park were three, feeding in a pine grove at McLeod Meadows on June 28.

Vesper Sparrow. *Pooecetes gramineus.* - A single bird seen at Radium on June 27 constitutes the only record for the park.

Oregon Junco. *Junco oreganus.*- Abundant along the highway and in clearings in semi-open woods. The deep spruce woods were less favoured. Juncos were nesting when we arrived but no young was seen out of the nest prior to our departure on June 29. A nest containing four eggs, from which the female flushed, was examined on June 21. This was in a strip of cleared lodgepole pine woods alongside the highway, the nest being in a bed of moss and overhung by a two-inch shelf of this growth. The materials used in construction were fine grass, horse hair, and deer hair.

Chipping Sparrow. *Spizella passerina.*- Common in pairs in many parts of the park where they frequented the same habitat as that occupied by juncos. On June 14 in open pine woods one was seen carrying nesting material.

White-crowned Sparrow. *Zonotrichia leucophrys.*- In the big burn a pair was established on a nesting territory which centred about the upper portion of a steep, rough slope and some flat, grassy land above it where uprooted trees, seedling pines, and shrubbery provided a variety of cover. Both birds were under observation on June 24 and June 25. This was the only record, neverthless the species probably is of common occurrence at higher altitudes.

Fox Sparrow. *Passerella iliaca.*- On June 25 one was heard singing at the edge of the forest bordering a slide about five miles south of Vermilion Crossing. Two other males were seen on the same date on slides bordering Tokumm Creek. No doubt further investigation will reveal that fox sparrows nest commonly in many such places.

Lincoln Sparrow. *Melospiza lincolni.*- A singing male was heard and seen on June 24 and June 25 on the same slide referred to above.

MAMMALS

Trapping of small mammals was carried on in the vicinity of Vermilion Crossing, at Rocky Mountain bungalow camp south of Kootenay Landing and at several localities between these two points. The only species that could be described as common (on the basis of trap returns) was the meadow vole. With this exception the population of shrews, mice, and voles was not large, the returns from 50 to 75 traps averaging less than a six per cent catch in 24 hours.

Species representation was large. Thus in one small area of spruce forest (roughly 300 feet by 200 feet, composed of dry and wet habitat and including portions of several small streams) a total of 11 species was taken. These were: *Sorex cinereus, S. obscurus, S. palustris, Microsorex hoyi, Eutamias amoenus, Peromyscus maniculatus, Phenacomys intermedius, Clethrionomys gapperi, Microtus pennsylvanicus, M. mordax* and *Zapus princeps.*

Many of these mammals used the same runways and burrows, as many as four different species being taken in the same trap in successive nights. It seemed likely that this crowding together of a mixed population was a temporary condition brought about perhaps as a result of flooding during the spring thaws.

Time did not permit a study of the general distribution of small mammals. This important question and the cyclic pattern of small mammal populations in relation to that of the highly valuable marten population, should be one of the main objectives in future work.

Much of the game animal population is migratory and present in the park only during the spring and summer months. From a game animal standpoint Kootenay Park as at present delimited will never occupy an important position as a reserve. Its area is not large enough and is disproportionately poor in winter range for the migratory species. Thus, with the exception of moose and goat and, to a less degree, of wapiti, the park is entirely dependent for its game population upon the conditions for survival on the wintering grounds beyond its boundaries.

The time at our disposal was too limited to permit of more than a restricted reconnaisance of game distribution. Though all species save the grizzly were encountered, the precise details of the distribution of each are apparently largely unknown. Further game studies are highly desirable.

The following list of the park's mammalian fauna is probably nearly complete. Richardson vole, lemming vole, and least chipmunk undoubtedly occur at altitudes higher than those investigated and the presence of bats other than the species recorded can be expected.

Cinereus Shrew. *Sorex cinereus.* - Two specimens of this shrew, both adult males, were trapped at Vermilion Crossing - one under a rock ledge beside a small stream, the other at the entrance to a burrow under a stump. A third specimen, about three-quarters grown, was taken beside a stream six miles south of this station.

Dusky Shrew. *Sorex obscurus.* - During the first ten days of trapping no dusky shrews were captured but subsequently, between June 24 and June 28, traps in the same locality captured three adult males and two adult females. Four were taken in a spruce swamp at Vermilion Crossing, the fifth at the entrance to a small burrow in the river bank some two miles north.

American Water Shrew. *Sorex palustris.*- Apparently rare in the park. Traps set along small streams in seemingly favourable places produced only one specimen, an adult male, in three weeks. This was captured in a trap set in a notch of a small log that dammed a diminutive stream flowing through spruce woods.

Pigmy Shrew. *Microsorex hoyi.*- Two specimens of this rare shrew were taken at Vermilion Crossing near the edge of the clearing in which stands the park cabin. One was trapped on the morning of June 10, the other in the afternoon of June 18; both were nursing females.

Little Long-eared Bat. *Myotis evotis.*- A small colony of this bat, from which specimens were taken on June 28, was established in the lodge kitchen at Vermilion Crossing. In day time they secreted themselves in a narrow space between a brick chimney and the house wall. All the seven specimens taken were pregnant females.

Bats of an unidentified species of *Myotis* were observed flying over the swimming pool at Radium Hot Springs.

Black Bear. *Euarctos americanus.*- Black bears frequented the highway and adjacent territory, the largest number seen in one day (June 21) being six of which three were yearling animals, the remainder consisting of a brown female with two brown cubs. One large animal came regularly to the campground at Vermilion Crossing and another smaller animal, probably a yearling, proved a constant nuisance at the lodge and at the park cabin. It was observed that droppings of the previous year, still largely intact, were composed chiefly of huckleberries. During June the diet consisted primarily of a wide

variety of green vegetation but the above-mentioned brown female was found, on June 28, to have eaten a mule deer fawn.

Grizzly Bear. *Ursus horribilis.* - No grizzly bear were seen by us. According to the wardens' accounts there are a number in the park, usually remaining in its more remote parts but occasionally in spring appearing on the highway. Thompson reports seeing a total of 11 in one day (1939) in the vicinity of Tumbling Creek. This number was composed of two parties, each comprised of two adults with two cubs and three other single animals.

Along Tokumm Creek on June 25, grizzly sign, both old and recent, was much in evidence. Here the bears had been digging the roots of the red loments. In one place a colony of small microtines had been excavated. Unmistakeable signs of the earlier presence of grizzly were seen along the upper parts of John McKay Creek on June 27. The westernmost record is that of a young female destroyed at Radium in 1929 (Meredith).

Marten. *Martes americana.*- Abundant in the Sub-alpine Forest and occurring elsewhere less commonly to the southern park boundaries. All the wardens agree that the population has increased and spread during recent years. As of some interest here it is to be noted that a trap-line in the Simpson Valley along the east boundary of the park produced 21 pelts in the winter of 1941-42.

Precise information concerning the food of marten in the park is a necessary preliminary in any plan for care and management of the species. Much could be learned from a study of the food debris in droppings. The collecting by park wardens of marten scats to be used for this purpose is suggested.

Fisher. *Martes pennanti.*- Apparently quite rare, the only record available being that of Mr. U. La Casse, who saw a single animal on Tokumm Creek in the summer of 1911.

Short-tailed Weasel. *Mustela cicognani.*- A nursing female was trapped beside a small creek at Rocky Mountain Bungalow Camp on June 21. No information is available concerning the status of this weasel in the park.

Mountain Weasel. *Mustela frenata.*- Trapping in numerous locations was unsuccessful in obtaining specimens of this animal and none was seen. It is included here on the authority of the park wardens.

Mink. *Mustela vison.*- Not particularly common. The wardens report that mink tracks are seen occasionally along the Kootenay River and Dolly Varden Creek. A specimen was trapped at Vermilion Crossing on June 27.

Wolverine. *Gulo luscus.*- Tracks are seen by the wardens every winter from the Sinclair Summit, where it is rare, to the northern limits of the park where it is more common. One was trapped on Simpson Creek near the eastern park boundary in the winter of 1941-42.

Otter. *Lutra canadensis.*- Of rare occurrence. Thompson reports seeing tracks and slides along Dolly Varden Creek in the winter of 1941-42.

Skunk. *Mephitis mephitis.*- Apparently quite rare. One was killed by a car near Kootenay Crossing several years ago (Thompson).

Badger. *Taxidea taxus.*- No animals seen but unmistakable burrows were observed in a small colony of Columbian ground squirrels on the flats of the Kootenay River along Settler's road.

Red Fox. *Vulpes alascensis.*- Thompson reports seeing tracks each winter and Rutherford saw one animal, December 1942, on Sinclair Pass.

Coyote. *Canis latrans.*- One was observed near the highway on June 24. It is apparently not common, and according to the wardens' observations is present only rarely in winter. The majority leave the park in late autumn, following the deer to their winter range in the Columbia and Lower Kootenay valleys.

Timber Wolf. *Canis lupus.*- No altogether satisfactory records have been obtained. It seems reasonable to suppose that animals cross the valleys from one range to another and this is the opinion of old residents who should know. Mr. V. H. Lord is satisfied that he heard wolves howling and saw one animal on the highway near Vermilion Crossing about eight years ago. Mr. W. Nixon, of Invermere, who trapped the valley before it was park territory, informed us that two wolves came up river from near Canal Flats in the spring of 1906. They crossed through the park in the vicinity of the Simpson Monument.

Cougar. *Felis concolor.*- Tracks considered to be those of five different animals observed between Radium Hot Springs and Wardle Creek January (or February) 1943 (Thompson).

The opinion was expressed that approximately this number of animals travel in and out of the park and that in no case is the entire circuit of an animal circumscribed by the park boundaries. The only sign seen by us was on the park boundary immediately north of Radium. Here a single scat of the previous winter contained the remains of bighorn.

Canada Lynx. *Lynx canadensis.*- Rare in the southern part of the park, one track seen on Sinclair Summit winter of 1942-43 (Rutherford). Tracks are noted regularly in winter, sometimes those of two or three animals, chiefly between Vermilion Crossing and Wardle Creek (Thompson). W. Nixon reports trapping 29 lynx in this same region in the winter of 1916-17. This is known to have been a year of peak abundance at widely scattered points in British Columbia.

Barred Bobcat. *Lynx fasciatus.*- Tracks seen in the snow on Sinclair Summit in 1935 were identified by Meredith as those of bobcat. This appears to be the only evidence of the occurrence of this species.

Hoary Marmot. *Marmota caligata.*- Two adult marmots were seen by the roadside at different places on Sinclair Summit, June 21. One ran into a burrow under rocks at the roadside, the other ran down a steep hillside and disappeared. Both these animals were silvery white on the foreparts and bright rusty brown posteriorly. Hoary marmots are not common in the lower altitudes of the park, whatever may be the conditions higher up. It may be of interest to record that in July 1926, Munro saw one standing on the base of the monument marking the boundary between Kootenay Park and Banff Park. Thompson reports that a pair still frequent that immediate area but none was seen there by us in 1943.

Golden-mantled Ground Squirrel. *Citellus lateralis.*- Several pairs of adults in winter pelage and a larger number of last year's young were under observation on June 13 in the camp-grounds at Marble Canyon. Burrows had been excavated under the camp buildings, beneath a log pile, and on an adjacent steep slope. Another smaller colony is established in a small burn about two miles south of Vermilion Crossing and a single animal was seen on the Sinclair Summit. There is said to be a colony at Radium Hot Springs but this was not verified.

Columbian Ground Squirrel. *Citellus columbianus.*- Abundant in most of the burns and other dry, open places, more particularly so in the vicinity of Kootenay Crossing. It was not seen north of Vermilion Crossing. No young had appeared up to the time we left the park on June 29.

Chipmunk. *Eutamias amoenus.*- Seen and a few trapped in various places between Sinclair Summit and Marble Canyon. An apparent scarcity of the animals at this time might be explained by the fact that females were nursing young and hence less active and conspicuous than is the case later in the season.

Red Squirrel. *Tamiasciurus hudsonicus.*- Heard or seen rarely and more often in the Sub-alpine Forest than elsewhere. Evidence of a greater abundance, perhaps in the previous year, were present in the form of workings and apparently unused burrows about mossy stumps and under the roots of spruces.

It is generally believed that the red squirrel is an important item in the diet of marten but to what extent this is so in the park is not known. A study of the relationship between these two animals would be essential in any program of management in the interest of marten.

Flying Squirrel. *Glaucomys sabrinus.* - It is related that flying squirrels frequently were taken in marten traps when trapping was permitted in what is now the park and the animal was considered to be abundant. Very likely it continues to be so but the only definite record obtained was that of an adult female trapped at Vermilion Crossing on June 17.

Beaver. *Castor canadensis.* - There are several beaver colonies in Dolly Varden Valley. One, close to the crossing, occupies an area of flooded *Carex* and willow. It was noted here on June 14 that mud had recently been added to a dam and other evidence of occupancy in the form of fresh droppings was observed. Rutherford informed us that two lodges about four miles above the crossing are now in use.

The park wardens state that beaver are moving from the creeks where living conditions are, or have been, at optimum to the Kootenay River which may be classed as submarginal environment. They believe that this

has followed as a result of a reduction in the amount of available poplar brought about by moose feeding on the young trees. To what extent such environmental change has taken place on the creeks was not determined. The explanation is perhaps valid in part at least but it is to be considered that beaver will feed and apparently thrive on lodgepole pine which is always abundant. Furthermore a natural increase of beaver that has probably taken place under protection would involve expansion and the eventual occupation of submarginal environment.

We found numerous old beaver workings on the Kootenay River and examined a recently established colony situated about a mile south of Rocky Mountain bungalow camp. Here a dam has been built across a small stream near its outlet and a considerable amount of spruce bottom has been flooded. Several poplars up to 56 inches in circumference have been felled and the branches removed. Here as elsewhere on the river the beaver live in burrows and do not build lodges.

It is suggested that a beaver census in the park is practicable and would provide information of considerable value.

White-footed Mouse. *Peromyscus maniculatus.*- Evidently at a low point in the population cycle in 1943. Only six were trapped at Vermilion Crossing, five of these in the cabin and one in the cabin clearing. Two other specimens were taken, one five miles south of Vermilion Crossing beside a small stream, the other in a meadow at Rocky Mountain cabin camp.

Bushy-tailed Wood Rat. *Neotoma cinerea.* - Said to be much in evidence during autumn when the dispersal of young is in progress. At that time and in winter it is attracted to the cabins. The only specimen examined was a young individual taken by Meredith at Radium on June 30. Here they were damaging flowering plants in a garden.

Rocky Mountain Phenacomys. *Phenacomys intermedius.* - Three adult specimens were trapped near the Vermilion Crossing cabin. One of these was taken at a burrow entrance under a moss-covered stump that was used also by meadow vole of which several were captured later in the same trap. Another was trapped on the edge of a small creek about six miles south of Vermilion Crossing.

Red-backed Vole. *Clethrionomys gapperi.* - This vole was fairly common in the spruce woods at Vermilion Crossing. It was taken on the banks of streams and on logs that spanned them, beside moss-covered logs and in numerous other situations. The first young were trapped on June 24.

Meadow Vole. *Microtus pennsylvanicus.* -The most abundant of the small mammals. It was trapped at burrow entrances under stumps and trees in the spruce woods, in runways beside logs, under log piles in open forest, in runways through patches of *Arctostaphylos uva-ursi* and on wet ground in *Carex* meadows. One colony, about two miles north of Vermilion Crossing, had numerous burrows in a small, mossy bank above a small stream and a patch of sphagnum. At the entrance of two burrows were cuttings of fine *Equisetum* about five inches long, and near another burrow entrance in a dry situation were cuttings of service berry. A female trapped on June 12 contained seven embryos; the first young to be trapped, June 23, was about one-quarter grown. Subsequently young of similar size were taken repeatedly.

Long-tailed Vole. *Microtus mordax.* - Much less common than the former.On June 10 an adult male and female were trapped beside burrows under mossy stumps near a small stream and another male was captured the following day at the same place. A nursing female and a male about one-third grown with enlarged testes were taken in a similar situation about two miles north on the night of June 28.

Muskrat. *Ondatra zibethica.*- Seen in Sinclair Creek and tracks identified on the shore of Dog Lake (Meredith). Reported also from a slough in Dolly Varden Creek Valley on the basis of tracks (Thompson).

Rocky Mountain Jumping Mouse. *Zapus princeps.* - Trapped with some regularity beside forest streams, in clearings, and in the spruce woods at Vermilion Crossing. Others were taken beside a meadow stream at Rocky Mountain bungalow camp.

Yellow-haired Porcupine. *Erethizon epixanthum.* - Reported to be less common than formerly. One was seen on June 14 near the bungalow camp at Vermilion Crossing.

Rocky Mountain Pika. *Ochotona princeps.* - The portions of the park visited contain no

talus heaps of the sort used by pikas and we saw none of these animals in 1943. However in 1931, one of us encountered them on the slopes of Boom Mountain. Undoubtedly they occur at higher altitudes but no other definite records were obtained.

Snowshoe Rabbit. *Lepus americanus.* - Observed occasionally on or near the road from near Radium Hot Springs to near Marble Canyon; it was nowhere abundant. The park wardens have not observed any marked change in numbers over a period of years.

Wapiti. *Cervus canadensis.*- Abundant and widely distributed in the park with major concentrations centred in the Kootenay and Vermilion Valleys. Here winter snowfall is light enough to permit wintering at least as far up river as Wardle Creek. On April 29 Wapiti of both sexes were ranging consistently as far as Vermilion Crossing and others were travelling further along the cleared road. Tracks of one individual were followed all the way from Vermilion Crossing to the Bow Valley in Banff Park. The tracks were followed for 11 miles.

In summer many of the bulls leave the herd and are seen on the slides up Tokumm Creek and along the Vermilion opposite Hawk Creek. Cows and young stock, accompanied by some bulls, summer in the valley bottom and on the lower slopes of the adjacent hills.

Wapiti come almost daily to the lick by the roadside just below the Simpson monument but do not become as tame as the moose that frequent the same lick.

White-tailed Deer. *Odocoileus virginianus.*- This deer is one of the most abundant and characteristic animals of the Vermilion and Kootenay Valleys.

According to local reports the bulk of the population moves down the Kootenay and out of the park in the late fall.In the last two years however small bands have wintered in the vicinity of the camps where men are engaged in removing beetle-killed pine. Here the logging operations provided a continuous food supply in the form of the *Usnea* on tree limbs.

When the park was visited on April 29 white-tails were already present as far up river as two miles west of Vermilion Crossing.

In the summer scattered individuals were recorded throughout the entire length of the main valley from Settler's road to Vermilion Pass and tracks were seen at least nine miles up Tokumm Creek.

Mule Deer. *Odocoileus hemionus.* Found to be less common than the white-tail in the parts of the park examined by us. Individuals, mostly does, were seen at Radium, John McKay Creek, Olive Lake, and up the Kootenay and Vermilion Valleys to Vermilion Summit.

As with the white-tail, the majority leave the park in the winter. However there is a limited area of wintering range adjacent to Radium and a few individuals were known to winter just north of Mount Wardle as recently as 1925.

Moose. *Alces americana.*- The most widely distributed, and with the possible exception of wapiti, the most abundant game animal in Kootenay Park. Signs of winter activity were found in all parts of the park visited. A heavy concentration had occupied the Kootenay Valley and the lower reaches of the Vermilion; all the slides up Tokumm Creek were heavily browsed.

Five or six individuals were noted almost constantly in the vicinity of the wet lick near the Simpson monument. Here they become very tame and constitute a great attraction for passing tourists.

In the summer months, however, the bulk of the moose population ranges in the alplands and near the upper limits of the Subalpine Forest biotic area.

A cow with twin calves was seen on June 24 on the banks of the Vermilion River just above Hector Gorge.

Rocky Mountain Bighorn. *Ovis canadensis.*- The bighorn has but a limited distribution in Kootenay Park. The only band known to be permanently resident inhabits the hills adjoining Sinclair Canyon. While the majority of the flock moves back to a summer range as yet unknown, small groups of ewes and young appear at road level periodically throughout the summer. They are attracted by two marl licks exposed by the highway cut-banks.

Prior to 1938 this flock was estimated to number 140 head but in the winter of 1938-39 a severe epidemic removed at least 114 individuals and there were doubtless additional, undiscovered deaths.

Three rams seen on the Simpson River during the summer of 1942 (Meredith) constitute the only other recent occurrences of sheep in the park.

However J. J. Meredith tells of shooting

rams on the west face of Mount Selkirk in the autumns of 1914 and 1915. Other evidence was discovered to bring the known occupation of this area down to as recently as 1920. There may still be a small summer population between Mount Selkirk and Split Peak.

Mountain Goat. *Oreamnos americanus.*- Goats are probably of general distribution in the higher parts of the park but were seen at but two places during the present study. On June 24 two were seen four miles up Tokumm Creek and on June 26, 49 were counted in small bands on the south and west slopes of Mount Wardle.

ACKNOWLEDGMENTS

We wish to express our appreciation of the various courtesies extended by Park Superintendent F. G. Horsey and staff during our stay in the park. Grateful acknowledgment is made also to park wardens Meredith, Rutherford, and Thompson for information included in this report and to Mr. Geo. Hopping, Entomological Branch, Dominion Department of Agriculture, for assistance in the field, for the use of unpublished data in connection with his investigation of bark beetle infestation, and for the analyses of the stomach contents of woodpeckers collected in the park.

AMENDMENTS TO BY-LAWS
——Ottawa Field-Naturalists' Club——

AT A MEETING of the Council of the Ottawa Field-Naturalists' Club held on Thursday March 30th, 1944 the following Amendments to the By-Laws were passed.

NO. 1. STANDING COMMITTEES.

Two Standing Committees of at least five members each shall be appointed by the Council from among its members, viz.: A Publications Committee and an Excursions and Lectures Committee.

NO. 6. DUTIES OF THE EXCURSIONS AND LECTURES COMMITTEE.

The Excursions and Lectures Committee shall make arrangements for field excursions and lecture programs subject to the approval of the Council. The chairman of this Committee shall submit a signed report to the Council at the close of each year, outlining the activities carried out under the supervision of this Committee during the past season. This report shall be embodied in the Annual Report of the Council.

By- Law No. 9. to become No. 8.

By-Law No. 10. to become No. 9.

By-Law No. 11. to become No. 10.

NO. 10. AMENDMENTS.

An amendment or an addition to these By-Laws may be passed at any meeting of the Council, by a three-quarters vote of the members present, due notice embodying a copy of the proposed amendment having been given at a previous meeting of the Council. Any such amendment or addition shall be published in the next issue of the *Canadian Field-Naturalist.*

TO BABES REALLY LOST IN THE WOODS[1]

By PAUL L. ERRINGTON
Dept. of Zoology and Entomology, Iowa State College, Ames, Iowa

WHEN YOU BAILED OUT, your main impression was that you were getting into something.

Your previous contacts with the wilderness had been comfortable and with advantages in your favor. Now this was different. You were alone and dropping right into the middle of it.

As a northern wilderness, it looked endless, which you knew wasn't so far from the truth, at that. There was one lake after another and they all looked alike. There was one wooded hill after another and they, too, looked alike. It was all the same picture, snow, trees, rocks, open spaces, and, when you tried to take your bearings on the ground, you decided that the best thing to do was to build a fire and hope that in due time someone found you.

If and when that came to pass, it might be desirable to be still alive and reasonably intact.

It is assuredly quite possible to die in this wilderness. Staying alive is to a large extent a matter of not making serious mistakes. It could, for example, be a very serious mistake to use up all your matches in lighting your pipe or in trying to see your way around in the dark when there wasn't any particular call for it, or to light fires each day when you had easy access to dead wood that would keep a couple of fires going for months. (By the way, as concerns fires, a small to medium-sized one is preferable for warmth and cooking to a big, weiner-roast blazer).

The problems of keeping warm and dry will have to be met by means of your own headwork and whatever equipment you happen to have along. It is a good idea to avoid getting sweated up and to be careful where you walk on ice having air holes over rapids and springs. The edges of streams, especially where the current runs close to the bank and freezing is more or less prevented by snowdrifts, may be treacherous, as may be thin ice in other places as in front of beaver houses in early winter. If in doubt, you may, before you step on it, punch the ice with the end of a long pole - which pole may be a useful article to have in your hands, anyway, in the event that you do break through.

Another bit of fatherly counsel: although you may not know even approximately where you are in the region as a whole, you may fairly easily acquaint yourself with the small area in which you may have to live - at any rate, well enough to safeguard yourself against losing your base when you cruise around for wood or food. A big pine with a strangely broken or twisted top may be visible for miles, or there may be a certain rocky ledge that you would not be likely to mistake anywhere. With familiarity, you recognize characteristic details in the most monotonous of surroundings. As you learn to work farther away from camp, always be mindful of new landmarks in relation to the old ones; if you decide to try to make your way out of the country, know what you are doing as you go, following streams or natural routes rather than heading overland and merely walking in some direction without paying attention to what you see.

Let us next consider the question of when and what do you eat. Don't waste too much time on thoughts of killing a moose or bear with your pistol or knife or doing something on a grand scale to secure a winter's food supply. You had best think first about snaring rabbits, which in most years are sufficiently abundant in wild areas for a man to live on. If you get lost in one of the years of periodic rabbit scarcity to which the North is subject, you may as well know that the Indians themselves may starve during such times.

Let us grant that there are plenty of rabbits. The thickets and swamps are criss-crossed with tracks, and the principal trails can be readily distinguished. It is in these trails, where rabbits often pass, that you set your snares - - slip-knot loops about five inches across and hanging about four inches above the floor of the trails. You set in narrow places in the trails where the rabbits run between small trees, and you arrange sticks as necessary to guide the rabbits or make them duck down in a desirable manner. You also use these sticks (or some that may lie naturally over or beside the trails) to make the

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snares hang right. If you have to use cord, shoe laces, or limp material for snares, the job of making them hang open and receptive requires more draping over twigs than would be the case if wire snares were used; and with limp snares, spring-pole devices are needed to lift struggling animals into the air. The braided steel wire commonly used for hanging pictures is handy for making snares; it can be broken by hand into suitable (1½ to 2 ft.) lengths by "tiring" (bending sharply and repeatedly back and forth at a given point) and will hold rabbits without the aid of a spring-pole if just fastened solidly beside the trail.

What besides snared rabbits as sources of winter food? What if you find yourself being thankful for anything to eat that is even halfway fit.

Rootstocks of cat-tails are relished by a number of animals, and a flour can be made from them; there may be other plant foods that would help you out, but be careful not to poison yourself. Rather than going around eating buds of this and bark of that, you might better try out your talents as a scavenger. Scavenging may lack dignity and class, so to speak, but it has survival value. The fact that scavenging may not always offer a safe livelihood is something else again.

What, in brief, is the sort of fare you *can* eat if you absolutely *must*? Meat that is downright rotten will probably make you sick, perhaps dangerously so, depending in part upon exactly what organisms are responsible for the decay. Meat that is not "too far gone" on the other hand, may sustain life. The human constitution, once it becomes accustomed, can endure or actually thrive on some pretty foul stuff. As a rule, you may be less particular about the freshness of mammal meat that you eat than of the freshness of fish, frogs, turtles, clams, and "lower animals" generally. You will have to use your own good sense as to what you eat, which will doubtless be only clean, firm, sweet-smelling flesh, unless you are desperate. In the event of digestive distress, you can make vomiting easier by drinking large quantities of warm water.

There is a formidable collection of diseases and parasites that can be contracted from eating uncooked or underdone meat, but, in real northern wilderness, your chances of fatal illness from this cause are not very great, even when you have to scavenge about the leavings of wild flesh-eaters.

All right, let's say you are in a mood to eat anything you can get down and keep down. Then keep your eyes open and be ready to investigate day-time assemblies of crows, ravens, gulls, and eagles; well-used trails of wolves, coyotes, and foxes. There might be freshly dead fish lodged along shore below rapids or falls or a partly eaten carcass of some sort with good meat left on it. Other sources of prospective winter food include "caches" of aquatic prey, as of minks and muskrats, in snowdrift tunnels along the edges of lakes or streams. These "caches" are most likely to be found in drifts over springs where the water tends to remain unfrozen and where there may be concentrations of the prey. Snowdrift tunnel systems may occasionally be dug out and found to contain hundreds of pounds of fishes, frogs, clams, etc., in frozen piles, and the springs themselves may be found with live and dead fishes so closely packed that they can be scooped out by the bushel. Of course, you may be unable to find snowdrift tunnels or springs, or anything to eat in the tunnels and springs if you do find them.

When spring comes, the problem of getting fresh meat may take some turns for the worse. Regularly used rabbit trails may not be so easy to locate after the snow melts, and, with warmer weather, dead meat becomes stale, and staleness grades off into ripeness. If you get a supply of fresh meat that might spoil before you eat it, you should cut it into thin strips and smoke or dry it to make "jerky". You may, if lucky and resourceful, be able to fish and to take advantage of the bird migration and the increasing activity of many wild creatures preoccupied with family affairs. A great variety of animals (including some large insects) have parts that are edible, and eggs that have unhatched birdies in them may still be eaten. You may find a lot of things if you work full time looking for them - notably along the edges of streams and woods. But spring (or summer) doesn't always give a man with little or no equipment unlimited opportunities to live off the country, and you may have to do what you ordinarily never would think of.

One of the best bets in forested North American wilderness would be to mooch off

the horned owls. This suggestion is not crackpot. Horned owls are among the most efficient of wild hunters, and, in the most heavily populated areas of their range, their numbers reach a breeding pair per square mile. Young are hatched out by April or May even in the North Woods and are fed by their parents until mid-summer. Quantities of food brought daily to the young may be considerable and may be further increased by a few tricks on your part.

Horned owl nests in evergreen woods are more difficult to find than in hardwood growths, but winter hooting (long, deep, resonant "hoo-hoo-hoo" notes) may give you clues as to where to look. Nests differ greatly in location and appearance. Most are stick nests made in previous years by hawks or other nest builders; some are in hollows of trees or on cliffs. Favorite roosting trees in the vicinity of nests may have underneath heavy "whitewash" spattering and deposits of pellets (which are not excrement, but castings of undigested bones, feathers, and fur thrown up by the owls). There may be fragments of prey (especially of rabbits) and occasionally a light yellow down feather caught on low vegetation. The parent owls may sit in trees around an intruder, hooting and snapping their bills, which is fair warning for you not to do anything foolish, such as climbing up the nest tree without being on guard against possible attack; while many owls may keep discreetly out of sight when you visit the nest, others may become bolder the nearer their young are approached, and may swoop with astonishing speed and force. It wouldn't be entirely far fetched to compare a blow on face or neck by a horned owl with a blow by spiked brass knuckles, and you could lose an eye or even suffer fatal wounds through carelessness. If an owl acts as if it may attack, be prepared to wave it off, with a stick or your arm. Don't try to injure it, if you expect it to bring you meat.

You should avoid taking liberties about a horned owl nest before the young are hatched, for you don't want those eggs to be deserted or chilled through exposure to late winter, North Woods weather. After the young are hatched, however, the old birds will, regardless of their sentiments toward you, stand for continued visits without deserting, and the young, when they appear to be from half to two thirds as large as the adults, should be penned up on the ground near the nest. If there are two or more young in the nest, each should be penned separately. You should, with ingenuity and a knife, have no trouble fashioning pens out of wood at hand. Pens should be cage-like, strongly enough constructed to be effective in holding the young owls yet open enough to allow visibility and ready feeding by the adult owl or by yourself. Carcasses or pieces of prey animals left about the pens may be removed for your own use. Robbing of the young should be systematic, thorough to the point of keeping them hungry and demanding of their parents but not to the point of permitting them to starve. Young that seem to be losing strength or ejecting suspiciously little pellet debris (say less than one small-sized pellet every other day) had better be given back some food. You should stay away from the neighborhood of the penned owls except when you have business there.

Toward midsummer the adults gradually become less attentive and finally stop feeding their young. By this time it would be well if you had discovered some other means of continuing to eat. If still desperate, you might get another meal or two by eating the penned owls, but you would probably feel it a more decent act to turn them loose.

Fall is usually the season of maximum abundance of wildlife, and young rabbits and young grouse, young creatures of many kinds, may be obtainable by clubbing, spearing or similarly elementary methods. When attempting to sneak up on anything, remember that "slow and easy does it", be set to jump or strike quickly, without waving of arms or other give-away movements.

Following fall, we naturally have winter, which is where we started. But maybe you won't have to complete the whole calendar year lost in the woods. Maybe, if you settle down beside a navigable river or some portage trail in a lake-chain, you will be picked up and taken out along in the summer. In the North are vast expanses of land where nobody lives, but there are numerous water courses along which someone may pass now and then, though that someone may be an Indian who can't speak much English and whose own food may be down to items that smell as powerfully as some of the things you didn't eat before you got genuinely hungry.

THE SUSCEPTIBILITY OF FUR-BEARING ANIMALS AND GAME BIRDS TO TULARAEMIA[1]

By JOHN H. BROWN, B. Sc. (Agric), M. Sc.[2]

INTRODUCTION

TULARAEMIA is primarily a disease of small wild animals such as ground squirrels (gophers) and rabbits, but it will attack man, a wide range of wild and domestic animals, and game birds.

The epidemiology of tularaemia is very complex and it is now known that it can be transmitted, disseminated and perpetuated in a variety of ways. Parker (18) in 1934 in referring to the epidemiology and epizootiology of tularaemia remarks as follows, "..... with the hope of giving some idea of the probable very far-reaching ramifications of this disease in nature. As regards the possibilities involved, it would be even more suggestive were it possible to add related observations by other investigators, both in America and abroad. In any event, the possible extent of these ramifications is suggested by the wide variety of insects and arachnids that are actual or possible transmitting agents and the apparent large number of their mammalian and avian hosts that are susceptible to tularaemia infection in a greater or lesser degree. Nor is the aspect of this disease which concerns human infection one to be passed over lightly. I know of no other infection of animals communicable to man that can be acquired from sources so numerous and so diverse. In short, one can but feel that the status of tularaemia, both as a disease in nature and of man, is one of potentiality."

Since 1934 it has been established that tularaemia infection can also be transmitted by water, and it has been observed that the infection persists in the water for upwards of one year.

The importance of tularaemia to the fur and game industry has been overlooked and ignored but such men as Seton (a), Brooks (b) and Hearle (c) have observed that some disease - - undoubtedly tularaemia - - is a big factor in "disease" epidemics and "cycles" in wild animals and birds. As the investigational work into the epidemiology of tularaemia advances it becomes more obvious that these men were right in their deductions, and it is becoming more apparent that a serious situation in regard to the whole future of the fur and game industry is now in the making.

The purpose of this paper is to record the known facts in regard to the relationship of tularaemia to fur-bearing animals and game birds, and to point out the situation as it now exists in Alberta.

HISTORICAL

Mammalian Infection

Tularaemia was discovered by McCoy (15) in 1910 while investigating a plague-like disease of ground squirrels in California. In 1912 McCoy and Chapin (16) isolated the causative organism and described it as *Pasteurella tularense* (*Bacterium tularensis*). In 1919 Francis (3) reported on tularaemia-infected rabbits in Washington, D.C. In 1926 Parker and Spencer (23) recorded the natural infection of many species of wild animals in Montana, and in the same year they indicated that the coyote could contract tularaemia through eating infected rabbits. Perry (25) working in California in 1928 reported the meadow mouse as carrying the disease. Parker, Hearle and Bruce (19) in 1931 reported on the occurrence of tularaemia in rabbits in British Columbia. In 1934 Schlotthaeur, Olson and Thompson (27) recorded the occurrence of tularaemia in the wild grey fox.

Parker (18) in 1934 recorded that the beaver, the black-footed ferret and the weasel were highly susceptible to tularaemia. Green (6) working in Minnesota in 1937 reported on the susceptibility of beaver to tularaemia. Hammersland and Joneschild (11) in 1940 made a report on tularaemia in beaver. Scott (28) in 1940 recorded the natural occurrence of tularaemia in beaver. Jellison, Kohls, Butler and Weaver (13) working in Montana reported in 1942 on the widespread occurrence of

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2. —Lecturer in Entomology, University of Alberta, and Director of the Alberta Rocky Mountain Spotted Fever Survey.

tularaemia in beaver and muskrat in that state. In the same paper they record that one skunk and a number of meadow mice taken in close proximity to a tularaemia-infected beaver pond were also positive for tularaemia.

Bow and Brown (1) in 1943 reported on the infection in jackrabbits and ground squirrels in southern Alberta.

Parker (in personal communication) in 1943 stated that the infection had been found in muskrats and that when an epizootic started in a colony it would kill all of the animals present. He also remarked that in two instances tularaemia was suspected as infecting antelope.

There are many instances on record that indicate that cats and dogs may contract tularaemia through the eating of infected mice, ground squirrels and rabbits.

Avian Infection

In 1926 Green, Wade and Kelly (8) showed that the ring-necked pheasant was susceptible to tularaemia. In 1929 Parker (17) reported quail (bobwhite) as a possible source of tularaemia infection in man. Green and Wade (7) in 1929 recorded the natural infection in quail. In 1932 Green, and Shillinger (9) reported tularaemia in sharp-tailed and ruffed grouse. Parker, Philip and Davis (21) in 1933 recorded a tularaemia epizootic amongst sage-hens. Parker (18) in 1934 showed that the green-winged teal and mallard duck were susceptible to the disease.

Water-Borne Infection

In 1936, Karpoff and Antonoff (14) working in Russia reported on the spread of tularaemia through water. In 1938 Hüseyin, Kemal and Oz (12) working in Turkey made a further record of water-borne tularaemia. Parker, Jellison, Kohls and Davis (20) working in Montana in 1940 reported tularaemia infection in water. Jellison, Kohls, Butler and Weaver (13) reported in 1942 on the presence of tularaemia infection in beaver ponds.

Arthropodan Vectors

Francis (3) working in Utah in 1919 demonstrated that deer flies (*Chrysops* species) were transmitters of tularaemia. In 1924 Parker, Spencer and Francis (24) reported the spotted fever tick *Dermacentor andersoni*, and the rabbit tick *Haemaphysalis leporis-palustris*, as natural carriers of tularaemia. Green (5) in 1931 showed that the dog tick *Dermacentor variabilis* carried the infection in nature. In 1933 Parker, Philip and Davis (21) published evidence that the bird tick *Haemaphysalis cinnabarina* was a natural carrier of tularaemia infection.

Parker (18) in 1934 reported that two species of horse fly, *Tabanus septentrionalis* and *T. rupestris*, and a member of the deer fly group, *Chrysops noctifer*, could mechanically transmit tularaemia to guinea pigs. He also showed that the black fly *Simulium decorum katmai* was a mechanical vector. In the same paper he records the sucking louse *Neohaematopinus laeviusculus*, an ectoparasite of the Columbian ground squirrel, as a vector.

Parker, Philip, Davis and Cooley (22) reported in 1937 that certain species of *Ornithodoros* and *Ixodes* may be incriminated in the transmission of tularaemia in nature and possibly to man.

TULARAEMIA IN ALBERTA

Contrary to popular belief tularaemia is well-established in Alberta and there is every indication that the situation is reaching serious proportions. Tularaemia infection has been demonstrated as being present in man, sheep, rabbits, Richardson ground squirrel, mice, shore-birds, spotted fever ticks, rabbit ticks; and it is suspected of being present in cattle, beaver, muskrat, mink, deer and horse flies, and water.

Shaw and Jamieson (29) in 1932 reported on the occurrence of tularaemia in man in northern Alberta. Gibbons (4) in 1938 recorded that tularaemia-infected ticks were present in southern Alberta. Bow and Brown (1) in 1943 reported tularaemia infection in man, ticks, sheep and Richardson ground squirrel in the Seven Persons Coulee area. Gwatkin, Painter and Moynihan (10) reported in 1942 on the occurrence of tularaemia in sheep in the Whitla area.

Unpublished records in the possession of the author show that over 30 human cases of tularaemia have occurred in Alberta. These cases are distributed all over Alberta from the extreme north to Milk River in the south. Many of the cases showed that the infection was contracted through handling infected animals, while other cases incriminated either ticks or deer flies.

Further unpublished records show that tularaemia infection is present in terns, mice, ground squirrels and rabbit ticks in northern and central Alberta.

DISCUSSION

It is apparent from the foregoing review of literature that the establishing of tularaemia in this province will have a very detrimental effect on the fur and game industry. It has not, as yet, been definitely shown whether tularaemia in relation to that industry is present or not, but from the information obtained it is believed that a very serious situation is in the making, if not already established.

In discussing the potentialities of the situation it should be borne in mind that to date no systematic attempt at investigating tularaemia infection as applicable to the fur and game industry has been undertaken. All of the information used in this paper as an argument for the need of such an investigation has been gathered by the author and his associates during their investigations into the occurrence of human cases of tick-transmitted tularaemia.

In the following pages the situation as it appears in Alberta will be discussed under the headings, Fur-bearing Animals and Game Birds.

1. Fur-bearing Animals.

Rabbits:- It is now well-known that tularaemia infection in rabbits is widespread in this province. Human cases of tularaemia contracted through the handling of infected rabbits have been reported from the extreme north and central parts of the province, while dead and sickly rabbits collected in the southern part have been shown to be infected with the organism. It is of interest to note that Philip (26), working in Alaska in 1939 showed that the varying hare in that area also carried tularaemia.

It has been observed and recorded countless times that rabbits are the main source of food for many of the larger fur-bearing animals. This is of great importance for Parker and Spencer (23) showed that the coyote could contract tularaemia through the eating of infected rabbits. If this is true for the coyote then it is apparent that any animal that feeds on infected rabbits runs the risk of contracting the infection. With the knowledge that infected rabbits are present in large numbers then it must necessarily follow that their predators are also suffering from the disease. Substantiation for this statement has been secured in southern Alberta where the coyotes in the area harbouring infected rabbits were observed to be in a sickly condition.

Many fur farmers procure rabbits, either through shooting, trapping or buying to use as food for their animals. To date there has been no definite proof to show that such a practice transmits tularaemia to these animals, but there is no doubt but that this practice is fraught with danger. It may be that the animal loss to fur farmers through some "unknown" disease is in reality due to tularaemia.

Rabbits are of considerable economic value as their pelts bring a fair return. It has been the custom in this province for schoolboys and others to trap and shoot these animals in the winter, but fur buyers report that lately the number of pelts coming to market is very small. On investigating the cause they found that a fear of contracting tularaemia has had a very great influence on the erstwhile trappers.

It should be noted that the rabbit acts as host for both the spotted fever tick and the rabbit tick.

Beaver:- Beavers have long been recognized as being the prime fur-bearing animal. So great was the demand in the past for their fur that they were nearly exterminated. Today stringent regulations governing their protection and trapping are rigidly enforced.

Beaver colonies are fairly well distributed throughout the province, but the majority are There have not as yet been any reports of confined to the foothill and mountain region. beaver in this province being infected with tularaemia but it is apparent from the work carried out in Montana that they are very susceptible to the disease.

Jellison, *et al.* (13) working in Montana reported that a total of 193 beaver were found dead in the period April to October, 1939. These animals were infected with tularaemia. It was also shown that the water in the beaver dams was infected with the tularaemia organism.

In examining the situation as it occurred in Montana it was found that the relationship between the contaminated water and the occurrence of tularaemia in beaver was not well understood. By this it is meant it was not possible to establish whether the infected beaver were the source of the infection in the water, or whether the presence of the organism in the water was the cause of tularaemia in the beaver. It is obvious however, that in

either case there is a very close relationship between the two.

There have been some rumours to the effect that beaver have died in certain localities in this province but these have not been substantiated as yet.

Muskrats:- These animals are very common in Alberta, being well-established in practically all parts of the province. Jellison, *et al.* (13) reported that in Montana a total of 11 muskrat were found dead in the period April to October, 1939. One of these animals was infected with tularaemia. The water in the muskrat pond was also found to be infected with tularaemia. Parker in 1943 (personal communication) stated that when an epizootic started in a muskrat colony it continued until all of the animals present died.

There is good evidence that tularaemia may already be established amongst the muskrat of this province. Three instances may be cited as proof. The first is that some time ago a disease appeared amongst the muskrat in the Banff area and occasioned considerable loss. The second occurred during the winter of 1942-43 when approximately 600 muskrat in the Ministik Lake, near Edmonton, died from some unknown cause. The third instance was recorded in the summer of 1943 when a trapper skinning muskrat trapped in King's Lake, near Lethbridge, contracted tularaemia. This man stated that he cut his hand during the pelting operations. One muskrat taken from this lake during August on autopsy showed typical tularaemia lesions on the liver and spleen. Tissue specimens were submitted to the laboratory for bacteriological examination but were not positive for tularaemia. A specimen of the lake water was also negative.

Mink:- The mink is a very common animal on fur farms, and as such it is distributed throughout Alberta.

There has not as yet been any definite record of tularaemia attacking mink in this province but as they belong in the family Mustelidae they are close relatives to the weasel and ferret, both of which have been shown to be highly susceptible to the disease. It is altogether probable that tularaemia is present because many of the fur farmers are in the habit of feeding rabbit and ground squirrel to their animals and, as has already been pointed out, there is a strong possibility that by so doing tularaemia may be transmitted to them.

It is well-known that many mink die from some unknown cause and it may well be that the cause is tularaemia.

Two human cases of tularaemia, both fatal, have occurred in fur farmers in the Cold Lake district. One of these cases was traced to a bite from a cat present on the fur farm.

Weasels:- To date there has not been any report of weasels in Alberta suffering from tularaemia infection, although Parker's (18) work in 1934 showed that they were highly susceptible. It is almost certain that tularaemia will appear amongst these animals for they feed largely on ground squirrels and mice, and both ground squirrels and mice in central and southern Alberta have been shown to be carrying the infection.

2. Game Birds.

Pheasants:- These game birds are present in large numbers in certain parts of the province. So far there has not been any record of an epizootic amongst them. Green, Wade and Kelly (8) reported that these birds were susceptible to tularaemia.

In the Brooks-Bassano area, where these birds are very plentiful, there are strong indications that tularaemia infection is present in jackrabbits and in spotted fever ticks.

Prairie chicken:- This bird is well distributed throughout Alberta but their numbers fluctuate from year to year. These "cycles" may be due to tularaemia infection.

Ducks:- The ducks in this province have been the cause of considerable concern during the last few years as they have been subject to some disease that is commonly called "Western Duck Sickness". This disease is epizootic and appears amongst ducks in certain lakes and usually destroys all of the birds on that lake.

"Duck sickness" has been observed in many parts of southern Alberta but in many cases only a few of the ducks would be affected. Under such circumstances the sick ducks would be found huddled on the edge of the lake. They were dopey and in very poor condition.

Parker (18) showed that the green-winged teal and the mallard were both susceptible to tularaemia. If this susceptibility is examined in the light of the work carried out by Parker, Jellison, Kohls and Davis (20) on the persistence of tularaemia infection in water it is obvious that a possible connection may be present.

SUMMARY

It has been demonstrated during the past six years that tularaemia infection is well-established in Alberta. Records show that the infection is widespread and that man, animals, birds and arthropods have been affected.

Approximately 30 human cases of tularaemia have been reported in this province. Many of these cases were contracted through the handling of infected animals while others were caused by bites from infected spotted fever ticks or by bites from infected deer flies.

Infected spotted fever ticks, *Dermacentor andersoni*, are exceedingly abundant in the southern part of the province. Infected rabbit ticks, *Haemaphysalis leporis-palustris*, have been reported from Edmonton, central Alberta and southern Alberta.

Jackrabbits infected with tularaemia have been reported from all parts of Alberta. Varying hares in Alaska, and presumably in the Northwest Territories, have been shown to be carrying the infection.

Richardson ground squirrels in the central and southern part of the province have been found to be positive for tularaemia.

Field mice in central and southern Alberta are known carriers of tularaemia.

Positive determinations for the disease have been made in sheep in the Seven Person's Coulee.

Coyotes in southern Alberta are suspected of being infected with tularaemia.

The muskrat in the Banff area disappeared a few years ago, and their disappearance may have been due to epizootic tularaemia.

Approximately 600 muskrat in the Ministik Lake died during the winter of 1942-43 from some unknown cause.

A trapper in the King's Lake area developed tularaemia after cutting his hand while pelting muskrat.

A fur farmer in the Cold Lake district (near Lloydminister) developed tularaemia and died during the summer of 1943. His infection was traced to a bite from a sick cat on his fur farm.

Many of the deaths amongst mink on fur farms may be due to tularaemia contracted through the feeding of infected rabbits and ground squirrels.

Certain birds in central Alberta have been found to be carriers of tularaemia.

There is a possibility that the so-called "duck sickness" is closely related to epizootic tularaemia.

The great fluctuation in prairie chicken population may be connected with this disease.

Water-borne tularaemia is as yet an unknown quantity, but it is certain that it is a potential menace to those fur-bearing animals and game birds that live in or on the water.

It is obvious from the above summary that the tularaemia situation in this province is rapidly reaching serious proportions. A detailed investigation into the ramifications of this disease, particularly as it affects fur-bearing animals and game birds, is required. Such an investigation, properly undertaken, would locate infected areas. Once these areas were discovered control measures could be applied and in this manner epizootic tularaemia would be prevented.

At the present time there is much discussion on "Wildlife Management"; it may well be that tularaemia is an important factor in the normal biological and ecological relationships between various animal groups, and it may also be a determining factor in the so-called "cycles".

REFERENCES

1. Bow, M. R. and Brown, J. H., 1943. Tularaemia in the Seven Persons Coulee, Alberta. *Can. Jour. Pub. Hlth.*, 415-418: Sept. 1943.
2. Brown, J. H. 1943. Tularaemia in Southern Alberta. *Can. Journ. Med. Tech.*, 5: June 1943.
3. Francis, Ed. Tularaemia Francis, 1921. A New Disease of Man. *U. S. Pub. Hlth. Serv. Hy. Lab.* (130), 1922. A series of articles by Francis and his associates.
4. Gibbons, R. J. Survey of Rocky Mountain Spotted Fever and Sylvatic Plague in Western Canada during 1938. *Can. Pub. Hlth. Journ.*, April, 1939.
5. Green, R. G. 1931. The occurrence of *Bact. tularense* in the Eastern Wood Tick, *Dermacentor variabilis*. *Amer. Jour. Hyg.* 14: 600-613.
6. Green, R. G. 1937. The susceptibility of beaver to tularaemia, *Minn. Wildlife Dis. Inv.*, 3: 110.

7. Green, R. G. and Wade, E. M. 1929. A natural infection of quail by *B. tularense*. *Proc. Soc. Exp. Biol. & Med.*, 1929. 26: 626.

8. Green, R. G., Wade, E. M., and Kelly, W. 1926. Experimental Tularaemia in Ring-necked pheasant. *Proc. Soc. Exp. Biol. & Med.* (26): 260.

9. Green, R. G. and Shillinger, J. E. 1932. A natural infection of the sharp-tailed grouse and the ruffed grouse by *Pasteurella tularensis*. *Proc. Soc. Exp. Biol. & Med.* XXX, pp. 284 to 287.

10. Gwatkin, R., Painter, R. H. and Moynihan, I. W. 1942. Tularaemia in Sheep. *Can. Journ. of Comp. Med.*, June 1942.

11. Hammersland, H. L. and Joneschild, E. M. 1940. Tularaemia in beaver. *Jour. Amer. Vet. Med. Ass'n.*, 96: 96.

12. Huseyin, Kemal, and Oz, T. V. 1938. *Turkische Zeits. f. Hyg. und Exp. Biol.*, 1.

13. Jellison, W. L., Kohls, G. M., Butler, W. J., and Weaver, J. A. 1942. Epizootic tularaemia in the beaver, *Castor canadensis*, and the contamination of stream water with *Pasteurella tularensis*. *Amer. Jour. of Hyg.*, 36, (2):168-182, Sept. 1942.

14. Karpoff, S. P., and Antonoff, N. I. 1936. The spread of tularaemia through water, as a new factor in its epidemiology. *Jour. Bact.*, 32:243.

15. McCoy, G. W. 1911. A Plague-like disease of rodents. *Pub. Hlth. Bul.* 43 (Part 11): 53 (U.S.).

16. McCoy, G. W. and Chapin, C. W. 1912. *Bacterium tularense* the cause of a plague-like disease of rodents. *U. S. Pub. Hlth. Bul.* 53 (Part V):17.

17. Parker, R. R. 1929. Quail as a possible source of tularaemia infection in man. *Pub. Hlth. Rpt., Vol.* 44, (17):999-1000: April, 1929.

18. ..... 1934. Recent studies of tick-borne diseases made at the United States Public Health Service Laboratory at Hamilton, Montana. *Proc. 5th. Pacific Sci. Cong.*, B5:3367.

19. ....., Hearle, E. and Bruce, E. A. 1931. The occurrence of tularaemia in British Columbia. *Pub. Hlth. Rep.*, 46, (2):45-46; Jan., 1931.

20. ....., Jellison, W. L., Kohls, G. M. and Davis, G. E. 1940. Tularaemia infection (*Bacterium tularense*) found in streams. *Pub. Hlth. Rep.*, 55, (6):227; Feb., 1940.

21. Parker, R. R., Philip, C. B., Davis, G. E. 1932. Tularaemia: occurrence in the sage hen, *Centrocercus urophasianus*, also report of additional cases following contacts with quail, *Colinas virginianus*. *Pub. Hlth. Rpt.* 47 (9):479-87. Feb. 26, 1932.

22. ..... Cooley, R. A. 1937. Ticks of the United States in relation to disease in man. *Jour. Econ. Ent.* 30 (1):51-69.

23. Parker, R. R. and Spencer, R. R. 1926. Tularaemia and its occurrence in Montana. *Mont. Stat. Bd. Ent., 6th. Bien. Rpt.* 1925-26.

24. ..... and Francis, Ed. 1924. Tularaemia infection in wood ticks of the species *Dermacentor andersoni* Stiles, in the Bitter Root Valley. *Montana Pub. Hlth. Rep.* 39 (19):1057-73. May 9, 1924.

25. Perry, J. C. 1928. Tularaemia among meadow mice (*Microtus californicus aestaurinus*) in California. *Pub. Hlth. Rpt.* 43, 260.

26. Philip, C. B. 1939. Tularaemia in Alaska. *Proc. 6th. Pacific Cong.* (*Sci.*), 5:71-73; Aug., 1939.

27. Schlotthauer, C. F., Olson, and Thompson. 1934. Tularaemia in a wild grey fox. Report of a case. *Proc. Staff Meet. Mayo Clin.*, 9:12.

28. Scott, J. W., 1940. Natural occurrence of tularaemia in beaver and its transmission to man. *Science*, 91:263.

29. Shaw, R. M. and Jamieson, H. 1932. Tularaemia. *Med. Assn. J.* 26.

a. Seton, E. T., Quotation by Jellison, *et al.* (13).

b. Brooks, Allan, Statement recorded by Parker, Hearle and Bruce (19).

c. Hearle, Eric, Insects and Allied Parasites Injurious to Livestock and Poultry in Canada. *Dom. Can. Dept. Agr., Pub.* (604): 1938.

THE GARRY OAK IN BRITISH COLUMBIA[1]

— An Interesting Example of Discontinuous Distribution —

By R. GLENDENNING
Agassiz, B. C.

SEVERAL YEARS AGO while studying Sudworth's *"Forest Trees of the Pacific Slope"* published in 1908, I became interested in a footnote on the distribution of the Garry Oak in British Columbia; viz., "An isolated grove on the northwest end of Vancouver Island on Quatsino Sound, and another on the Fraser River 1½ miles above Yale". As I had failed to notice any oaks near Yale though frequently passing through this area, and as the above records were doubted by later authors who quoted Sudworth, I decided to substantiate or disprove them, and to run these records to their original sources. It has been very interesting work. The oaks were eventually found to exist at Yale nearly one hundred miles from the main area of distribution, and were found to have increased from a "grove" to a permanent part of the flora of considerable extent. I have been unable to verify the Quatsino record either by visit or correspondence, but my enquiries on oaks led to the location of an un-recorded, isolated, colony on Sumas Mountain near Chilliwack.

Apart from the original discoverer of these records, interest lies in the peculiar incidence and method of dispersal of these outliers far from the main area of Garry oak occurrence, that at Yale being eighty airmiles distant, that at Sumas forty miles, while Quatsino Sound lies at least one hundred and ten miles from the nearest oaks on the east coast of Vancouver Island.

Distribution.

The Garry oak, *Quercus Garryana* Douglas, was described by its author in 1839, the type locality being given as "Plentiful on plains near Ft. Vancouver, on the Multnomah, and at Puget Sound" (Piper - *Flora of the State of Washington*, 1906). Sudworth in his *"Forest Trees of the Pacific Slope"*, 1908 says "Described originally from plains around Vancouver on the mainland but not seen there since". But as Whitford and Craig point out in their book *"The Forests of British Columbia"* (Commission of Conservation 1918), there are no plains around Vancouver, B. C., and evidently Sudworth mistook Vancouver, B.C., for Vancouver, Washington.

It is worthy of remark here that although no Garry oaks occur in or around Vancouver, B.C. the madrona *Arbutus Menziesii*, which occupies a very similar range throughout the Pacific area, occurs plentifully on the warm rocky shore line of West Vancouver, and scattered individuals still stand in Vancouver itself.

The Garry oak is the only species of *Quercus* that occurs in British Columbia. As at present known, the distribution of *Q. Garryana* extends from the Santa Cruz mountains in California northward through Oregon and Washington gradually being confined to the coastal areas at the northward limit of its range in Washington and British Columbia. Its northward limit on the mainland, with the two exceptions to be discussed later, is at Fairhaven Bluff on the coast some five miles south of the town of Bellingham, U.S.A., and twenty miles from the International Boundary at Blaine.

On Vancouver Island it is local but plentiful on the warm rocky shoreline of the south eastern portion, from the southern tip at Victoria, north as far as Comox, and on the adjacent islands in the Gulf of Georgia. It extends a few miles inland where dry well drained slopes occur, but then seems to be choked out by the dense coniferous forest.

The record for Quatsino Sound, if authentic, is the only station on the west coast of Vancouver Island.

Origin of the Yale Record.

It was tolerably certain that Sudworth had not discovered nor even visited the isolated Yale stand, but he gave no source for his information in *"The Forest Trees of the Pacific Slope"*. However after some search a reference to these oaks in very similar words was found in Macoun's *"Catalogue of Canadian Plants"*, Part III, 1886. But Macoun evidently

1. —Received for publication January 3, 1944.

had not visited this stand as he gives Dawson as his authority for the record.

Now Dawson (G.M.) was primarily a geologist, and it would be a very observant botanist even, who would notice a few oak trees amidst the wild rugged terrain surrounding Yale; it was therefore extremely doubtful if he was the pioneer discoverer, especially as no specimens of the Garry oak collected by Dawson from Yale are extent in the National Herbarium at Ottawa.

Further enquiry was finally rewarded by the location of the following passage by Dawson in the Geological Survey Report for 1879-80, entitled, *"Notes on the Distribution of Some of the More Important Trees of British Columbia"*. Referring to the Garry oak, he says:- "Flourishes in the south-eastern portion of Vancouver Island though Mr. A. C. Anderson mentions the existence of a few trees a mile and a half above Yale on the Frazer river, and these Mr. Cambie informs me are still to be seen".

Here then was the probable discoverer and original recorder, Mr. A. C. Anderson of the Hudson Bay Company, and this point has been amply proved by reference to his writings, viz., *"The Dominion at the West; a brief description of the province of British Columbia, its climate and resources"*, 1872, *"Notes on North-western America"*, 1876, and *"History of the Northwest Coast"*, 1878.

In all these writings Mr. Anderson mentions seeing oaks, his earliest reference being to 1847, when a score of small trees - - with one specimen having a trunk one foot in diameter, are mentioned, but as early as 1876, even he, doubted if they still remained, as evidenced by his remark ".....unless they may have been considerately spared for their rarity, it is questionable whether any now remain".

Mr. Walter B. Anderson of Victoria, son of Alexander Caulfield Anderson, and like him a keen observer of all natural phenomena, has informed me that he well remembers his father speaking of the Yale oaks. Unfortunately Mr. A. C. Anderson's manuscripts, like others dealing with the early history of the Pacific Northwest were "borrowed" by Bancroft, the Californian historian and have remained in California ever since; whether further details of the oaks were given or not I cannot say.

Origin of the Quatsino Sound Record.

As far as the writer knows Sudworth's is the earliest record for this location, but as with Yale he gives no authority for his statement. Whether he visited Quatsino or not, I do not know. I have been unable to find any further reference, and neither Macoun nor Dawson mentions it.

Origin of the Sumas Mountain Record.

As far as is known this location was first mentioned in an article by the author in the "*Forestry Chronicle*", December 1934.

The site was visited by Mr. J. W. Winson of Huntingdon and the writer in 1933 as a result of information given to Mr. Winson by A. E. Humphrey, Land Surveyor of Chilliwack. Further inquiry has revealed the fact that the original discoverer of this colony was a homesteader named John MacKay who lived nearby, and who went to the mountain seeking hardwood for farm implement repairs. Vine maple, *Acer circinatum* or dogwood *Cornus Nuttallii* were generally used in pioneer days for this purpose, but finding oak he told his friends and the information has lingered. This was approximately forty years ago, but no data is available as to the size of the trees at that time. As noted later when describing this colony, the age of the oldest trees was given as thirty-five in 1933, and while MacKay and his friends may have chopped down some slightly older trees, these were not found on the occasion of our visit.

Data on the Yale Colony.

This site was first visited in 1933 when the oaks were readily found by following the directions of an old prospector, resident of Yale.

The exact location of the colony is roughly one and one-half miles north of the town of Yale on the opposite bank of the Fraser River. At this point a cable spans the river which here lies in a deep narrow canyon with cliffs some 200 feet high. The closely adjacent mountains rise steeply to approximately 4,000 feet and form a deep gorge.

The oaks occur on a rocky promontory between the Canadian National railway and the river, and also on an adjacent hillside. In 1935 they covered about thirty acres, and are sparsely intermingled with broad leaved maple, *Acer macrophyllum* Pursh, Douglas fir *Pseudotsuga taxifolia* (Poir.) Britt.; western Birch *Betula occidentalis* Hook., wild cherries Prunus *virginiana* L. var. *demissa* (Torr. & Gray) Torr. and *P. emarginata* (Hook.) Walp. and the juniper *Juniperus scopulorum* Sarg.

The plant association is typical of oak environments elsewhere; a drier type of the prevailing Humid Transition zone. There are several hundred trees of varying ages extending for about half a mile along the foot of the mountain, all within 100 yards of the left bank of the Fraser. None occur, or at least were found on the right bank where the Canadian Pacific railway tracks and the Cariboo Highway run, although at this point the river is only about sixty yards wide and a similar environment obtains.

From information received from the local Canadian National railway section foreman an additional colony may exist at Stout, formerly Saddle Rock on the Canadian National railway some six miles north of the Yale stand. The trees are not visible from the Cariboo Highway, even through binoculars, so probably are much younger and fewer than those near Yale.

From the general composition of the colony near Yale it would appear that the stand is gradually spreading southward; the oldest trees occurring on the highest part of the promontory at the north end.

In a preliminary notice published in the "*Forestry Chronicle*" in December 1934, the age of the oldest tree found was estimated at eighty years. A subsequent visit in 1935 revealed a much older tree when the age of this, and the previously examined trees, was determined closely by means of an increment borer.

The oldest tree, evidently the parent of the entire colony, is growing on the top of a dry rocky ridge about 200 yards north of the cable way. In 1935 it was twenty-two inches in diameter, had lost a large limb, and gave other indications of considerable age. It was impossible to bore to the centre of this tree owing to the hardness of the heart-wood, but six inches of boring showed one hundred and five annual rings. A conservative estimate of the number of rings would therefore make this tree at least 175 years old in 1935. From the poor, rocky environment, and from the fact that oaks are proverbially slow growing in youth, it is probable that 200 years would not be an excessive age to ascribe to this tree. This would be in good agreement with data given in "Sudworth" for dimensions and ages

of trees of this species, as he gives the age of one tree nineteen inches in diameter as 183 years, and a second of twenty-seven inches as 251 years.

This dates the germination of the parent of the Yale colony back to A.D. 1760 or before, which ante-dates by many years the advent of Europeans to this area.

Half a dozen trees were found whose age was 60 to 75 years, and several dozen from 30 to 35 years old. There were hundreds of younger trees of varying ages besides the usual scrub oaks arising from suckers. Natural reproduction from seed was prolific and acorns were plentiful. Insect pests were conspicuous by their absence. No dead trees or rotten stumps that could be identified as oaks were found, though search was made. No evidences of fire were visible even on the boles of large balsam and fir trees from two to three hundred years old growing nearby.

It would appear therefore from the above evidence that the colony is definitely an outlier from the main distributional area of comparatively recent origin, and not a relict of a former wider distribution.

Data on the Sumas Mountain Colony.

The location of this stand is on the southern slope of Sumas Mountain one mile west of the main pumping station. It can be reached by walking down the old Canadian National Railway right of way. This location is approximately 35 miles from Fairhaven the nearest point of the main distribution area, and 60 miles from the Yale occurrence.

The site is on a rocky spur running down into what used to be Sumas Lake before reclamation; there are several similar spurs on this southern slope but the oaks were found only on this one.

There are some thirty or forty trees here, the oldest not over 35 years of age in 1933. As at Yale no evidences were found of older trees so it would appear that it is a recent colony and not a relict. The older trees are found about 250 feet above the level land at the base of the mountain, younger trees about ten years old occurred lower down. As at Yale the flora here is typical dry arid transition, but competition from conifers and broad leaved deciduous trees is probably more pronounced.

Data on the Quatsino Sound Colony.

As stated above I have been unable to visit Quatsino Sound but have corresponded with Mr. G. H. Waller, Forest Ranger for this district. He states that he has been unable to locate any oaks in this area, but contacted an old settler who said that a few trees did exist at one time on the south shore of the main inlet. As this area has since been logged off this may account for their apparent disappearance. However, Mr. Waller rather doubts his informant, and also doubts if Garry oaks have existed here within the memory of white men. As the shoreline of this extensive inlet is over 100 miles in length, it is still possible that intensive search would be worth while.

Quatsino Sound is 110 air miles north west from the northern limit of oaks on Vancouver Island at Comox, and in view of the Yale and Sumas locations, there would be nothing surprising in a stand at this point.

If the origin of Sudworth's reference could be traced more light might be thrown on this occurrence.

Mode of Origin of the Colonies.

As pointed out above, the entire absence of dead or fallen trees, or rotting stumps at both Yale and Sumas would indicate that these colonies are in all probability more or less recent extensions from the main distributional area. The absence of other colonies in the many suitable environments that occur on the lower mainland would also support this contention. But by what means were the original acorns transported to these sites?

As the Yale stand ante-dates European explorers in these parts by many years, this source must be ruled out. Indians in all probability frequented the site of the Yale colony occasionally on their annual fishing expeditions, but the site at Sumas would not have been an Indian camping place, and I have the authority of Mr. W. B. Anderson for the statement that the local Indians do not, and never have, used acorns for food; therefore they had no reason to carry them long distances. Wind and water are out of the question for physical and geographical reasons, thus leaving only mammals or birds. Of these only the Band-tailed pigeon, *Columba fasciata* Say or possibly the Mourning dove, *Zenaidura macroura* (Linn.) would be capable of transporting acorns such a distance without injuring them. Squirrels, jays and crows would be limited to a few hundred yards as carriers, and in any large animal the digestive organs

would destroy acorns before voiding.

The crop of the Band-tailed pigeon however is a suitable receptacle, and it is well known that these pigeons feed extensively on oak mast, and 100 miles is not too far for these birds to fly before digestion occurred. Band-tailed pigeons are still common birds in these parts, moving erratically considerable distances, being here to-day and gone tomorrow. A flight of less than one hour after feeding, some accident - an Indian arrow or attack by a hawk - and the acorn-stuffed crop would be spilled and an embryo oak colony would be underway.

While, doubtless, the chances for such a combination of fortuitous circumstances may seem small, when we consider the time factor and the immense number of pigeons in past ages, the odds are not so remote.

Two records relevant to the above theory might be mentioned. Scott Elliot in a work on seed dispersal quotes Reid for the suggestion that the oak woods of England arose after the ice age by acorns transported from France by birds. Then in a recent number of the Journal of the Royal Horticultural Society of England some extracts were given from David Douglas's account of his collecting trips for that Society in 1824 in what is now Oregon. In speaking of *Castanea* (*Castanopsis*) *chrysophylla*, one of the chinquapins native to Oregon and California he says "The fruit is delicious and abundant, and forests composed of this timber during the season of fruit teem with *Ursus*, *Cervus* and *Columbae*, of the latter I have killed several birds more than 200 miles distant from the nearest point where they could obtain seed, and found in the crop abundance of fruit which I ate and found good". If chinquapins can be so carried and still be edible, why not acorns?

The suggestion that pigeons are responsible for the inception of these oak colonies far from the main body appears to be the only explanation that fits all of the facts on the cases described above, but of course is only an unproven theory.

Acknowledgments.

I am greatly indebted to the following gentlemen for their assistance in this investigation.

Mr. W. B. Anderson[2] of Victoria, son of the discoverer of the Yale oaks for confirmation of several facts relative to this work. Mr. J. W. Eastham of Vancouver and Mr. Herbert Groh of Ottawa for time spent looking up references in scarce publications. Mr. G. H. Waller of Port Hardy for information on the Quatsino record, and to Mr. J. W. Winson of Huntingdon for stimulating criticism, useful information on the Sumas occurrence, and pleasant company on the several trips of exploration needed to obtain the data presented here. To Dr. J. M. Swaine, Director of Science Service, I am also indebted for the encouragement given to pursue this enquiry.

2. —Deceased February 1, 1944.

BOOK REVIEW

STUDIES IN THE LIFE HISTORY OF THE SONG SPARROW II, THE BEHAVIOR OF THE SONG SPARROW AND OTHER PASSERES, *by Margaret Morse Nice, Trans. Linnean Society of New York, Vol. 6, pp.8 + 328, 1943.*

This the second volume resulting from Mrs. Nice's intensive song sparrow studies that began in 1929. The first (1937, *Trans. Linn. Soc., N. Y.*, 4, pp. 248) dealt with the Song Sparrow. The present study is one of bird behavior, with examples from the whole field of bird study and containing much original data on the song sparrow.

The table of contents contains eight pages. Such diverse topics as: first appearance of new motor coordinations; escape reactions; scratching the head; post juvenile moult; social dominance; time of awakening; form of song; do song sparrows sing like their grandparents; territory; relation of the pair to each other and their neighbors; egg laying; care and defence of the young, enemy recognition and innate and learned behavior, are discussed.

A host of minutiae are recorded and abstracted and given value by being correlated with other data, views and theories on the subject. As a guide to the ideas and literature there is a bibliography of 29 pages on bird behavior. This volume should be in the hands of every bird student. — A. L. RAND.

LAURENCE BEDFORD POTTER
1883 — 1943

By J. DEWEY SOPER
Winnipeg, Manitoba

LAURENCE BEDFORD POTTER, the well-known ornithologist of southwestern Saskatchewan, died in the Jubilee Hospital, Eastend, Saskatchewan, Canada, on November 5th, 1943. For about ten years he had been in poor health and was forced periodically to quit work. Finally, after undergoing several surgical operations and other treatment in Canada and the United States, from time to time, he passed away with intense suffering on the day following his sixtieth birthday.

Laurence Potter was the son of the late Reverend Peter and Mrs. Georgiana Potter. He was born in St. Thomas Vicarage, Monmouth, England, on November 4th, 1883—the ninth child in a family of twelve. His father was a much loved Anglican rector who had a lifelong affection for birds, trees and gardening. In his youth, Laurence was very quiet, with a somewhat retiring disposition, but he always possessed a keen sense of humour. He particularly enjoyed reading and cycling and time for observation in the country. He was educated at King Edward School, Bromsgrove, Worcestershire, and throughout life was greatly attached to his old school.

During June 1901, he set sail for Canada and travelled directly to Gower Ranch, in the Frenchman River Valley, near Eastend, Saskatchewan. This ranch had been developed for a few years by an older brother, Ernest S. Potter, who had trekked west from Whitewood, Saskatchewan, in 1897. Except for a few comparatively short absences, Laurence resided here practically to the end of his life.

Soon after going to Gower Ranch, Potter's interest in birds became greatly stimulated. At first he seems to have absorbed an extensive amount of lore regarding them without thought of committing his knowledge to paper. However, in 1906 he began to methodically write up his observations on the local avifauna, a habit which he continued faithfully thereafter. His journals are replete with interest and occupy a unique place in the annals of Saskatchewan ornithology.

As the years went by, he corresponded more and more with naturalists whom he came to know, and gradually built up a working library of books and papers. After a time he joined various scientific societies and thereby, through their periodical literature, reaped a harvest of knowledge, persuasion and encouragement such as he had never previously experienced. He was elected to the American Ornithologists' Union at the meeting in New York, in 1919, and attended several later meetings. In 1922, he was elected to membership in the Ottawa Field-Naturalists' Club, and to the Cooper Ornithological Club in 1925.

It was about the time of joining the A.O.U., or some 18 or 20 years after settling near Eastend, that he began elaborating his field notes and publishing articles on the birds of his little-known district. Thus, his contributions appeared from time to time in *The Condor*, *The Canadian Field-Naturalist* and *The Auk*—the majority of them in the first named periodical. In the beginning, at least, he felt that this was the logical place for records of western bird life. By these efforts he gradually gained distinction as an original observer and became widely known both in Canada and the United States. In the end he was generally regarded as an authority on the birds of southwestern Saskatchewan where he established many notable "firsts" for the provincial bird list.

In addition to these more obvious accomplishments, he was influential in furthering the science in other ways. He would, for example, undertake to carry out special inquiries at the instigation of distant workers and he generously contributed natural history material to the Grand Coteau Museum, Shaunavon; the Provincial Museum, Regina; the National Museum of Canada, Ottawa; and perhaps other institutions. He was a federal honorary game officer for a lengthy period, gained wide respect for his dignified insistence against abuses, imparted his knowledge of and love for birds, and did much to awaken

a local consciousness for desirable bird protection and conservation.

An outstanding characteristic was his delight in the companionship of kindred spirits. It was natural as the great southern plains became more uniformly settled, that a few persons would appear with impulses similar to his own—true naturalists at heart, be they interested in bird or beast. He formed friendships that were close and enduring. Among such local men were Charles Holmes of Dollard, Spencer Pearse of Ravenscrag, and Steve Mann of Skull Creek. Great was his pleasure in spending a day afield with a fellow ornithologist, roaming the wild stretches of the Frenchman Valley and the high adjoining plains, or exploring the rugged coulees that pierce the southern flank of Cypress Hills.

Not least among the highlights of Potter's life at Gower Ranch were the times he was visited by eminent naturalists from other parts of the continent. Many times I have seen his face light up with pleasure when describing such occurrences. He probably got more out of these rare contacts than his visitors at the time ever realized. In 1927 while working for the National Museum of Canada, I made my headquarters at the ranch for two weeks. To this day, the kindness and hospitality shown is a cherished memory—the kind of good fellowship that stood out predominantly, even in the great ranching country where hospitality is proverbial. Since then I have been back many times. Each time my own pleasure seemed to increase in being in his company again, and in having walks and talks together amid the birds and scenes which he loved so well.

His outdoor alliances embraced more than birds. Though he wrote only on the this subject, he was keenly interested in mammals, plant life and fossils. He cultivated a fine garden in the shelter of his main tree plantation and sent cuttings of his specialty—native red, amber, and yellow *Ribes* (Missouri flowering currant)—to many experimental gardens.

Potter was the author of about two dozen papers on birds. Most of these were short notes, but in value they were usually out of all proportion to their length in the way they dealt with matters of exceptional interest. Frequently they presented new bird records for Saskatchewan, or for the Cypress Hills region, or for otherwise rare occurrences in respect to various species but little known on the Missouri watershed of the southern part of the province. Some of his nesting records were also of unique interest.

His earliest contribution appears to have been "Blackbirds Flocking", which was published in *The Condor* in 1922. The last paper, "Bird Notes from Southwestern Saskatchewan" (*C. F.-N.*, 1943), was published only a few days before his death and I am happy to say that he was able to see this before losing consciousness. It may also be added that latterly he became deeply interested in the Yorkton Natural History Society, Yorkton, Saskatchewan, of which he became a member when it was founded in the autumn of 1942. Some time later he began contributing bird notes to its official bulletin *The Blue Jay*.

Potter accomplished so much in his chosen avocation that his name henceforth will be spontaneously linked with the birds of southwestern Saskatchewan. Altogether aside from his attainments along these lines, his associates have good reason to remember him for other qualities. His was a pleasing and friendly personality—a man of abounding hospitality and wholesome enthusiasms for things of the great out-of-doors. He was deeply religious, strongly attached to the Anglican Church and a licensed lay-reader for many years. How inadequate, and yet how better is a man to express himself in a few words respecting a loyal friend than to simply say that all who knew him will deeply mourn his passing. Particularly acute is the grief of his only surviving relative in Canada—his devoted sister, Miss M. Isabel Potter of Eastend. The Canadian West has lost not only one of its prominent pioneers, but also one of its best field ornithologists.

NOTES AND OBSERVATIONS

ENGLISH BIRD NOTES. —Last year the well-known British Ornithologist, Mr. Kinnear of the British Museum, offered to help bird-minded Canadian Members of the Services, who were in England, to study English birds. The happy results enjoyed by one of our men overseas is shown by the following excerpt from a letter from LAC D. S. Miller to Mr. H. G. Mack of Guelph, Ontario.

"I took your advice and contacted Mr. Kinnear and he made a very interesting programme out for us. On the 13th January, Gord and I visited Mr. Kinnear at the museum and talked over the birding programme. I asked if he had any copy of the particular article you wanted but most of the books and birds were not handy as they had already been put in safe keeping. On the 14th we were invited to Mr. Witherby's place but unfortunately he was ill in bed. That did not however stop us from seeing Wood Larks (quite similar to our Horned Larks) which are very rare and localized. On the 15th we visited Mr. Seth-Smith of Essex County (he was the former Zoo curator) and had a grand walk in the country and, incidentally added several species to our ever growing list. Some of them were: Nuthatches (looks like a cross between our red-br. and white-br.), Bullfinch, Sparrow Hawk (which is an accipiter). After our long walk we had tea at Mr. and Mrs. Seth-Smith's house and had a long talk on birds in general.

"On the 16th we went to the famous Zoo but were quite disappointed as most of the animals and birds were dispersed. They had some lovely Iceland Gyrfalcons and other birds of prey. As we arrived just half an hour before closing time we did not have very much time — but we were quite satisfied with what we did see.

"On the 17th Mr. R. S. Fitter of the London Natural History Society took us to the famous Epping Forest where Queen Elizabeth had her hunting lodge. There we saw some very interesting birds; such as Hawfinch (somewhat like one of our grosbeaks), Reed-bunting, Great Titmice (these are very comical creatures with long unwieldy tails), Green Woodpecker, Stock-Dove and we also frightened 6 Fallow Deer.

"On the 18th we had a very good day. We visited Mr. Glegg who works (on his own) in the Lord Rothchild Museum. He showed us some of the treasures (namely the best Bird of Paradise egg collection in the world), etc. then took us for a very interesting walk — we encountered Corn Buntings, Goldeneye Duck, Greenfinch, Goosanders, Linnets, Meadow Pipits, Smew and 1 Common Sandpiper. On the 19th at Hammersmith Bridge we saw a 2nd yr. Iceland Gull and a few Lesser Black-backed Gulls. All in all, we had a splendid time of it all. Thanks very much Mr. Mack for advising me to get in touch with Mr. Kinnear — he must have gone to a lot of trouble to arrange such a nice programme."

All of our members will join us in expressing our thanks to Mr. Kinnear and his colleagues for their much appreciated attention and hospitality to our men overseas. — A. L. RAND, NATIONAL MUSEUM OF CANADA.

THE SWAMP CRICKET FROG, *Pseudacris nigrita triseriata* (Wied), IN QUEBEC. — Logier and Toner had no records of the swamp cricket frog east of the boundaries of Ontario (1943, *Canadian Field-Naturalist*, 57, p. 104).

On October 3, 1943, one was seen and caught as it hopped through the short grass on the edge of a grassy, swampy vale, in Quebec province, three miles north of Gatineau Point on the east side of the Gatineau River.

The identification of this specimen has been checked by Mr. C. Patch of the National Museum of Canada.

The record slightly extends the known range of this species and is the first published record for the province of Quebec.

— A. STANLEY RAND, 15 ROSEDALE AVE., OTTAWA.

NOTES AND OBSERVATIONS

OCCURRENCE OF THE CHIMNEY SWIFT AT HARRINGTON COUNTY, QUEBEC. — About midday on June 2, 1943, Mr. Edward Osborne, of Harrington Harbour, saw what he supposed was a swallow flying somewhat frantically about his fishing "stage", or small water-side building in which fish are cleaned. He watched it fly around the building for a time and then saw it enter and alight, face upwards, on the flat surface of the ceiling boards. This further aroused his interest, since there are no birds in this locality that alight in such a manner. When he approached it, it resumed its flight but appeared to fly blindly, unable to avoid obstacles in its path. It flew so close to his face that he raised his hand to protect himself, but in so doing he accidentally struck the bird, which thereupon fell dead at his feet. The weather at the time was chilly and there was still a good deal of drift ice in the vicinity.

When the specimen was brought to me, I tentatively identified it as a Chimney Swift (*Chaetura pelagica*), on the basis of its colour, size, and form, together with its resemblance to a swallow in flight. It was gray rather than sooty-coloured, had stiff spines at the outer ends of the tail-feathers, and possessed bowed wings with a spread of twelve inches. The principal flight-feathers in the wing were hard and were longer than the tail-feathers. It had a tiny hooked bill, but a relatively large mouth. In the same year I examined Chimney Swift specimens in the National Museum of Canada and confirmed the identification.

It appears that the Chimney Swift has not previously been recorded from the north shore of the Gulf of St. Lawrence east of Matanek, which is about 285 miles west of Harrington Harbour. —LAURA N. THOMPSON, HARRINGTON HARBOUR, QUEBEC.

CURRENT LITERATURE

Did the Folsom Bison Survive in Canada is discussed by L. C. Eiseley in the *Scientific Monthly*, 56, pp. 468-472, 1943. After pointing out that the remains of a large supposedly extinct bison, found in association with human articles at Folsom, New Mexico in 1927, indicated that man had been longer in America than previously believed, he advances a tenuous argument that the large extinct buffalo may have lingered on in northern Canada until recently, and that the big wood buffalo may have represented the last of the stone age bison. The fact is ignored that several extinct bison are known from northern Canada.

The ten year index to the *Auk*, volumes 48-57, 1931-1940, prepared by H. S. Swarth and George Willet, edited by George Willet (Amer. Ornith. Union, Lancaster, Pa., pp. 374, 1941 [=1943]) is a welcome volume. The material is indexed under author, locality, subject, genera and species so that it is a quick and easy reference to a large mass of bird literature.

Hummingbird's ability to fly backwards has often been noted, but it is less well known that their wing structure is specially modified so that on the back stroke the wing turns over, and the front edge is directed to the rear. A beautiful photograph of a Central American hummingbird, taken at 1/30000 of a second showing the wing on the back stroke, with the back of the wing turned forward has recently appeared in *Animal Kingdom*, 66, p. 9, 1943, taken by D. B. Eisendrath. —A. L. RAND.

SOME FAMILIAR CANADIAN BIRDS. *By A. L. Rand. Special Contribution — 43 - 4 — National Museum of Canada, mimeographed*, 23 pp., *Ottawa*, 1943.

In this publication Dr. Rand gives a popular story about twenty-four common birds to answer the general enquiries that the Museum receives asking for "information about birds". The material included gives an excellent summary of information for the beginner. Black and white cuts from "Birds of Canada" are included and one page tells about bird books for those who wish to carry their studies further. — HOYES LLOYD.

BOOK REVIEW

NAME THAT ANIMAL, A GUIDE TO THE IDENTIFICATION OF THE COMMON LAND AND FRESH-WATER ANIMALS OF THE UNITED STATES, WITH SPECIAL REFERENCE TO THE AREA EAST OF THE ROCKIES, *by Ernest C. Driver, 527 pp., E. C. Driver, Smith College, Northampton, Mass., 1942. Price $5.00.*

To present, in a single volume, an adequate guide to the fauna of the United States, from protozoans to mammals, is an ambitious project. It is of course impossible to make a complete coverage of all groups. A reasonable compromise is to confine the treatment of groups for which abundant guides exist, or which require the services of an expert and abundant reference material, to a general discussion and outline of classification; and to devote most of the available space to a fuller treatment of the remaining groups. This course Prof. Driver has followed with considerable success. The Protozoa, Porifera, Coelenterata, Bryozoa, Gastotricha, and Rotifera are taken to genus. The flatworms, roundworms, and annelids are treated in varying degress of completeness. The principal genera and common species of molluscs are considered. Amongst the arthropods, the insects are taken to order only; the arachnids to genus in the scorpions, to family in the spiders, and to order elsewhere; the remaining classes key down to genus. Coming to the vertebrates we find that the birds are briefly discussed and an outline of the classification presented, but that identification is not attempted. In the remaining classes keys to the principal species are included. In the case of certain complexes the reader is referred to other works for complete identification.

The book concludes with brief chapters on eggs and on tracks.

The keys appear to be simple and reliable. Like most usable keys they are artificial to a considerable extent. As, however, they are preceded by an outline of the classification of the group in question, the student should have little difficulty in building up a picture of the relationships. Some attention has been given to the danger of certain organisms being sought in the wrong group; e.g. the legless lizards are found in the snake key as well as with the lizards.

A fairly uniform system of illustration by line drawings has been adopted, diagrams illustrating diagnostic characters of the group and then a number of examples being given. Line drawings are certainly the best means of illustrating such a book, but a good many of these appear to have been simplified to the point where they have little value. For example, it seems safe to assume that any reader has already as clear a mental picture of a squirrel as that given by the drawing of a gray squirrel. In some cases it might have been preferable to have devoted the same amount of space to small sketches illustrating distinguishing features of similar species. No scales are given for any illustrations save those of tracks. The lack of dimensions for the lower forms will hinder the beginner.

The binding, paper, and printing are good, though the occasional accidental line of boldface type in a few keys is mildly disturbing and irregular lettering detracts from the appearance of many plates. Waterproof covers would be an improvement in a book designed for field use.

The lack of any index and of cross-referencing between keys and illustrations is a hindrance to anyone wishing to find the proper name of any animal known by common name only. Furthermore, the beginner would feel more certain of his ground if, after keying down to species, he found a brief description of the animal. However, the extra space involved would probably have required division of the work into two volumes, and the author makes it plain that the user is expected to refer to one or more of the cited works for final confirmation. For a single volume the scheme adopted is probably all that could be asked.

This book should prove of considerable value to biology teachers in schools and small colleges, to private naturalists, and to all those with limited reference facilities.

— D. B. O. SAVILE

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CONTENTS

PAGE

The Mississippi Valley Pocket Gopher (*Geomys bursarius* Shaw) in Manitoba. By J. Dewey Soper 71

Peloria and other Abnormalities in Orchids. By Henry Mousley 73

The Status of the Fisher, *Martes pennanti* (Erxleben) in Canada. By A. L. Rand 77

Gleanings from the Natural History of Huron County, Ontario. By C. H. D. Clarke 82

The Recent Status of Nova Scotia Fur Bearers. By A. L. Rand 85

Notes on the Status and Distribution of Certain Mammals and Birds in the Mackenzie River and Western Arctic Area in 1942 and 1943. By C. H. D. Clarke 97

Notes and Observations:—

Notes on the Large Short-tailed Shrew at Fort Garry, Manitoba. By J. Dewey Soper 104

Extension of Range of Puget Sound Spotted Skunk (*Spilogale phenax olympica*). By Kenneth Racey 104

Extension of Range of the Northern Spotted Owl (*Strix occidentalis caurina*). By Kenneth Racey 104

Current Literature 81, 84, 96, 103

Book Reviews 105

Members of the Ottawa Field-Naturalists' Club and Subscribers to the Canadian Field-Naturalist, May, 1944 106

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THE MISSISSIPPI VALLEY POCKET GOPHER (*Geomys bursarius* Shaw) IN MANITOBA[1]

35,343

By J. DEWEY SOPER
Winnipeg, Manitoba.

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After many unsuccessful efforts, *Geomys bursarius* was finally discovered in southern Manitoba during the spring of 1943, occupying a strip of territory in the extreme southern margin of the province east of Red River. This is the only part of Canada in which the species, or genus, has been taken, and the species may now be formally added to the Manitoba list. Previous numerous attempts to take *Geomys* yielded, instead, varying numbers of the Dakota Pocket Gopher (*Thomomys talpoides rufescens*). This did not alter my belief in regard to the possibility of its eventual capture north of the 49th parallel, as *Geomys* was known to inhabit adjoining parts of northeastern North Dakota and northwestern Minnesota.

On the morning of May 15, 1943, three handsome examples were taken at a point 2.1 miles north of the International Boundary and 11.5 miles east-northeast of Emerson (Sec. 14, Tp. 1, R. 4, W. of Prin. Merid.). In choosing to set traps in this instance, there was apparently nothing in the superficial character of the mounds to distinguish them from those of *Thomomys*. But the possibility of *Geomys* was suggested, first, by the far southeastern position near the Minnesota line, and, secondly, by the low, sandy loam nature of the terrain (elev. 800′) which is described as a favourite resort of this genus. All of this country lies in the Transition Life Zone. A high proportion of the land is under cultivation, with scattered woodland areas of deciduous trees and shrubs.

After the initial success in securing three specimens, more traps were set at fresh workings in the surrounding country and a series of 7 more was obtained in a short time. Measurements of these 10 specimens in millimetres and weights in grams, respectively, are as follows:

No.	Sex	Length	Tail	Hind foot	Weight
4609	♀	258	84	34.0	222.1
4610	♂	288	94	38.5	326.2
4611	♀	259	83	34.0	224.0
4615	♂	285	85	36.1	228.0
4616	♂	290	91	37.0	276.4
4617	♀	261	80	34.0	222.6
4618	♀	272	81	34.0	260.7
4624	♀	241	72	33.5	220.1
4625	♀	265	80	35.0	220.0
4626	♂	298	86	36.5	343.0

These pocket gophers are distinguishable at a glance from *Thomomys* by their rather bright brown pelage, larger size, and grooved upper incisors. In fact, they are at once recognizable when only the head protrudes from a burrow. General colouration is a mixture of Dresden brown to cinnamon brown, brightest on the top of head and neck. Underparts are somewhat paler. The forefeet are noticeably white, the hindfeet dirty white and ashy. Most of the above specimens show little or no sign of shedding. A few have a relatively inconspicuous, curving demarcation line on the dorsal surface just forward of the rump, where a little fuscous shows. In the two distinct areas on either side of this line there is a slight difference in the shade of brown displayed. Where some fuscous is rather indistinctly visible through the guard hairs, the colour effect approximates mummy brown.

There is little or no discernible difference in the workings of *Geomys*, as compared with *Thomomys* in the same type of soil - at least, as observed in Manitoba. For a time after I

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had seen several dozen mounds of the former species, I was tempted to believe that they averaged larger than those of the smaller animal. However, after more experience, and subsequently re-studying the mounds of *Thomomys* in a fresh light, I came to a different conclusion. In sandy loam both east and west of Red River I have seen mounds thrown up by the latter species fully as big as anything that I have found belonging to the animal under discussion. This information was gained by trapping at these unusually large mounds in the south, which I was certain at the time belonged to *Geomys*, but to my repeated disappointment yielded only *Thomomys*.

As the matter stands at present, I know of no certain means of differentiating between the external workings of the two species in southern areas of the same character where either one or the other, or both, may occur. These remarks do not apply to the sub-surface runways and feeding tunnels, as those of *Geomys* are the larger and they also seem to have a greater average depth underground than those of *Thomomys*.

The distribution of *Geomys* in southern Manitoba has not yet been satisfactorily worked out. So far, I have found it only east of Red River to a maximum distance of about three miles north of the International Boundary. On general considerations it appears certain that workings observed from near Emerson eastward for 12 miles to the area where specimens were obtained in May, 1943, belong to the present species. In October of the same season I had occasion to travel east from the latter locality, in the same latitude (approx. 49° 02'N.), and traced the occurrence of pocket gophers to a point 20 miles from Emerson, or to within 11 miles of Roseau River. I confidently believe that these also belong to *Geomys*. Therefore, the strip of territory that the species apparently occupies in Manitoba east of Red River is one about 20 miles long and, let us say, three miles wide.

Geomys may have been responsible for sandy loam mounds observed at Green Ridge a few miles to the north. Unfortunately this was not definitely determined, as traps set for a couple of hours during the afternoon, while en route, brought no results. East of Red River and north of the southern strip of country referred to above, signs of pocket gophers are exceedingly scarce. In addition to Green Ridge, they have been seen only near La Broquerie, Isle des Chenes and at Pine Ridge. At La Broquerie and Pine Ridge the animals are known to be *Thomomys* and it is quite likely that this is also the case at the other points.

Up to the time of writing there appears to be no unimpeachable record of *Geomys* in Manitoba west of Red River. The type of lowland environment immediately west of this stream, and near the International Boundary, is essentially similar to that in which the species occurs to the east. However, trapping near Reinland and Mowbray, two to three miles north of the 49th, produced only *Thomomys*. It seems to me highly improbable that *Geomys* is present anywhere on the second prairie steppe (west of the post-glacial Lake Agassiz area) where elevations range from about 1,100 to over 2,000 feet above sea-level. On this terrain I have done considerable field work across the southern extremity of the province from Morden to Saskatchewan and invariably the pocket gophers collected have been *Thomomys*.

PELORIA AND OTHER ABNORMALITIES IN ORCHIDS [1]

By HENRY MOUSLEY
4073 Tupper St., Montreal, Que.

I WONDER how many people really know the meaning of the word Peloria, or if they know about it, whether they have ever come across an example of it in our Native Orchids. Not one in a thousand I imagine, for it is a very rare phenomenon indeed, and papers on or references to the subject are few and far between. Most of the Guides and Text-books have nothing whatever to say on the subject except, perhaps, in the glossary, should there be one. Since this is so, perhaps it may not be out of place if I try to explain the meaning of the word Peloria.

First let us consider briefly the normal orchid. Now as you know the orchids are a very large cosmopolitan family of herbaceous perennials, consisting of over five hundred genera, and not less than ten thousand species, of which about forty genera and over one hundred and forty-six species are natives of our range. They have fibrous or tuberoid roots or corms. The flower consists of six divisions, the three outer ones are sepals (two of which are often united), and the three inner ones petals. One of these petals (usually the lowermost) normally differs from the other two and is known as the lip or labellum, and there is produced an irregular flower.

Furthermore, an orchid flower has no free stamens and pistils, the filaments and styles being fused to form what is known as the column in the centre of the flower. This is a more or less fleshy structure showing a wide range of variability, but it constitutes the one distinguishing feature diagnostic of the Orchid Family. On the front of the column, facing the lip, is situated the sticky stigmatic area to which the pollen adheres during pollination and fertilization. In some species above the stigmatic area, there is a projection of the column known as the rostellum, really a modified stigma, which serves an important function in the pollination of orchids by insects. The summit of the column in most orchids is usually occupied by a cap-like structure known as the anther, which is commonly mobile, whilst the bed in which the anther rests is called the clinandrium. Now it so happens that once in a great while an irregular flower, such as an orchid, tries to become regular by the supression of its irregular portions. Thus is produced a condition of peloria or peloris-ation meaning the process of conversion of a flower to a regular form, from its normal irregular form.

An example of peloria is seen in the accompanying illustration (fig. 1) which represents a peloric flower of the Large Yellow Lady's Slipper (*Cypripedium Calceolus* L. var. *pubescens* (Willd.) Correll),[2] sheet No. 483 in my herbarium, which latter has recently been donated to the Montreal Botanical Garden. This plant, originally from Hamilton, Ontario, was given to Mr. Cleveland Morgan who grew it in 1943 in his lovely garden at Senneville, about 18 miles north of Montreal, and later presented it to me. As can be seen from the photograph, the large slipper or lip has been suppressed, and has been replaced by an extra petal similar to the other two normal ones.

As soon as I saw this plant I felt sure it was a case of peloria. To be certain, however, I sent the photograph to Dr. Schweinfurth of the Botanical Museum of Harvard University, who confirmed my identification, and at the same time kindly cleared up a point I was not quite sure about. In the photograph there are five more or less curled segments of which two represent the original two petals, and another the extra petal which replaces the eliminated lip. Thus of the two remaining parts, one of course represents the lateral sepal, the other perhaps an extra sepal or as I then thought a second additional petal. Dr. Schweinfurth, however, says in his letter "but this flower seems to show an extra sepal, since normally the two lower or lateral sepals are almost entirely united. Or it may well be

1. —Received for publication, January 21, 1944.

2. —Botanical Museum Leaflets, Harvard University, 7: 1-18, 1938.

that in this flower there occurred a splitting of this lateral sepal into two subequal parts, in addition to the extra petal being substituted for the lip. An examination indicates that this may be the case." I now feel convinced that this second suggestion, that of the splitting of the lateral sepal into two subequal parts, is the correct solution of the case. This being so, we now have all the six segments duly accounted for. The two narrow upper ones representing the original two petals, the lower middle one the extra petal replacing the eliminated lip, whilst the remaining two lowest ones represent the equally divided lateral sepal. These parts, added to the large posterior one above the lip, now complete this flower making it a regular one of six parts, instead of an irregular one of five.

Of course there are many other abnormal forms that arise in orchids. Some forms occur which are not strictly peloric, but which may be said to have a more or less marked tendency towards being so. Such for instance, is a coloured drawing (in the herbarium of the Montreal Botanical Garden) of the Pink Lady's Slipper (*Cypripedium acaule*) collected by Frère Marie-Victorin near Montreal, in which the usually large "slipper" lip has been reduced to a mere speck of its former size and beauty. Masters in his Vegetable Teratology on page 398 says, "entire absence of the labellum, frequently without any other perceptible change, is of common occurrence" which seems to fit the case in question, since no other change has taken place beyond the almost entire elimination of the labellum. Except for this abnormality, there are no other peloric or near-peloric orchid specimens in the herbarium, and I believe there is a similar condition in the National herbarium at Ottawa.

Regular peloric forms are perhaps the most easily determinable. In these, the petal which normally forms "the lip" is similar to the other petals. As I have already mentioned, articles on peloria are very scarce indeed. Dr. Schwein furth in his letter says, "that a rather careful search failed to bring forth any articles about peloria in our native orchids. Among our slides however, I find three examples of regular peloria (suppression of the irregular member, or lip) in Spiranthes."

(1) *Spiranthes Romanzoffiana* - Crater Lake, Oregon, *Wynd. 1651.*

(2) *Spiranthes cernua* - Arkansas, *Palmer 24170a*

(3) *Spiranthes cernua* - Missouri, *Bush 3316.*

He mentions the extraordinary case of the Florida form of the widespread *Epidendrum cochleatum* L. which bears three anthers and is designated as var. *triandrum* Ames. Apparently the variety is the only form of the species found in Florida and is endemic to that state.

As regards my own experience, although I have been interested in orchids for over fifty years, both in this and the old country, I have never come across an example of peloria, nor have I handled an example until the present one came into my possession. I can, however, give one reference to a paper that came to my notice some twenty years ago. It appeared in the Joint Bulletin No. 6 of the Vermont Botanical and Bird Clubs, April 1920, under the name of Anne E. Perkins, and reads in part as follows -

"I collected in Vermont an abnormal orchid. The specimen was sent to C. A. Weatherby who writes concerning it as follows, "I have just received the queer orchid which you collected at Berkshire, Vt. back from Professor Ames. He states that my second conjecture was correct and that the plant is an abnormal form of *Habenaria psycodes.* It is an example of the phenomenon known as peloria. In this case the petals are repeated and the lip with the spur is eliminated, I find a precisely similar form has been recorded in *Habenaria fimbriata* (Lynn N.H., H. G. Jessup, *Bot. Gaz.* XVIII. 189) and also in *H. ciliaris.* The opposite kind of peloria in which the petals have spurs like the lip has also been at least once noted in a species of *Habenaria.* In the case of your flower the peloria seems to have extended to the stamens which by the production of one or two additional anther-sacs, show a partial reversion to a primitive regular-flowered type. I find a similar phenomenon recorded in a peloric flower of a European species. Professor Ames does not say whether he has seen such a form in *Habenaria psycodes* before; but I find no record of one."

In addition to the above, I am able to give some references to Peloria in a few British orchids as follows, viz;

Figure 1. Large Yellow Lady's Slipper *Cypripedium Calceolus* L. var. *pubescens* (Willd.) Correll (Peloric form).

In Colonel Godfrey's *British Orchidaceae*, 1933, there is a beautiful coloured drawing (Pl. 58) by his wife of a peloric form of the Bee orchid (*Ophrys apifera* Hudson), in which the lip is pink and petal-like but much larger than the petals. Again, in *Native Orchids of Britain*, 1925, Mr. C. B. Tahourdin gives a photographic illustration of this same orchid stating that the "Bee" lip is replaced by a simple pink petal. He states also that a peloric form of *Orchis mascula* was found in Kent in 1913. and three specimens were recorded from Suffolk in 1885, while Luxford's *Reigate Flora* (1838) records such specimens from that neighbourhood. Of *Gymnadenia conopsea* also, peloric forms have occurred near Dover. Of forms not strictly peloric he says "I have seen a white specimen of *Orchis mascula* in which the flowers were exceptionally fine and perfect, with the exception of the spur, which on some of the florets was scarcely present at all, one or two only being really well defined, the largest measuring only 5/32 of an inch in length. Some forms of *Platanthera chlorantha* have been recorded with three spurs, others of *Orchis morio* and *Ophrys muscifera* with two, and even three "lips", whilst in a spike of *Epipactis* (*Amesia*) *latifolia*, the Broad-leaved Epipactis, some florets had two, some three lips. There were other irregularities in this bloom which is described in the *Orchid Review* for November, 1922." In my introductory paper "The Genus Amesia in North America", published in *The Canadian Field-Naturalist* of January and February 1927, there will also be found a description of several other curious forms of *Epipactis* (*Amesia*) *latifolia*.

Of works on teratology or the study of malformations and monstrosities, there appear to be four important ones - by Penzig, Worsdell, Masters, and Vuillemin, all four dealing not only with peloria in orchids, but also with peloria in all its forms in the entire vegetable kingdom. Of the first named author, A. G. O. Penzig, there appears to be no copy of his work extant in Montreal, but I am able to give the exact title and date of publication, "*Pflanzenteratologie systematisch geordnet*" 2 Vols., Berlin, 1890-94. The Library of McGill University, however, has both volumes of Worsdell's work as well as a copy of Masters', In this latter work, entitled Vegetable Teratology, published by the Ray Society in 1868, M. T. Masters speaks of peloria as regular and irregular, in the following words,

> "When an habitually irregular flower becomes regular, it does so in one of two ways; either by the nondevelopment of the irregular portions or by the formation of irregular parts in increased number, so that the symmetry of the flower is rendered perfect, as in the original peloria of Linnaeus, and which may be called irregular peloria, while the former case may be called regular peloria. This latter appearance is therefore congenital and due to an arrest of development."

As a case of regular peloria in orchids, Masters gives a figure on page 223 of *Cattleya marginata*, in which the lip is replaced by a flat petal. This appears to be one of the few figures of peloria given in the Orchidaceae; but on page 227 we find a list of genera in which regular peloria has been most often observed, and again on page 238 a further list of those genera in which irregular peloria has been most often observed.

In the work by W. C. Worsdell, entitled, "The Principles of Plant Teratology", also published by the Ray Society in 1916, we find in volume 2, pl. XXXV, a coloured plate of *Cypripedium insigne* (Lady's Slipper), in which the posterior sepal behind the lip is divided into the original two sepals. This is an interesting example, since it conforms (in part) to what has taken place in Mr. Morgan's plant already described.

In plate XXXVI, there is an illustration of *Cypripedium Pitcherianum* (Lady's Slipper), in which the flower has two labella or lips, with a posterior view also of the labella, showing the incomplete bipartition of the original single organ.

Plate XXXVII represents a peloric flower of another orchid *Odontoglossum grande*, with the labellum or lip in the form of an ordinary petal, stamens present and fertile, column with three fertile anthers and three rostella. Plate XL gives a coloured illustration of *Cypripedium insigne* (Lady's Slipper), in which the two lateral petals are changed into "lips" (labella).

Plate XLII gives an illustration of *Platanthera chlorantha* (Butterfly orchis), in which the two lateral sepals are spurred.

Plate L gives coloured illustrations for three further orchids, - 1. *Cypripedium superbiens* (Lady's Slipper), in which there is an ad-

hesion of the two lateral petals to the posterior sepal, and a suppression of the labellum; 2. *C. barbatum* (Lady's Slipper) with an adhesion of the two anterior sepals (arising by division of the single one) to the lateral petals; 3. *Cattleya Loddigesii* having a dimerous (two members in each part) flower with lateral petals absent and two "lips" (labella) present.

The last plate in the volume, Plate LIII, depicts *Dendrobium Wardianum*, a flower showing the two lateral petals which had become united and occupied the position of the "posterior" sepal. All the flowers of the plant in the raceme were affected in the same way!

Coming now to the work by Paul Vuillemin entitled *"Les Anomalies Végétals"*, Paris, 1926, in the library of the Montreal Botanical Garden, Mr. Jules Brunel of that Institution has very kindly sent me a translation of what Vuillemin has to say on the subject of Peloria. It is as follows (pp. 106-108)-

"Peloria is said to be regressive when a complex petal, like a lip or a spurred segment, returns to the simplicity of the other petals.....

"In the orchidaceae, trimerous (three members in each part) peloria occurs when the lip becomes similar to the other petals. Brongniart (1850) mentions an example in *Paphiopedilum* (*Cypripedium*) *caudatum* Pfitz., in which the three internal stamens were fertile. *Uropedilum Lindeni* is nothing but this abnormality. Known also in *P. Sedeni* Pfitz., *Catasetum eburneum* Hort., *Odontoglossum citrosmum* Reich. f., *Coelogyne cristata* Lindl. (Wigand), *Cattleya Forbesii* Lindl. (Magnus), *C. marginata* Reich. f. (Masters), *C. pumila* Hook, *C. intermedia* Grah., *Laelia purpurea* Hort., *Phalaenopsis Stuartiana* Reich. f.. *Aerides crisna* Wallr., *Cypripedium spectabile* Salisb., *C. Spicerianum* Reich. f.

"According to Penzig, *Paxtonia rosea* Lindl. is perhaps a peloric form of *Spathoglossis*.

"Actinomorphy is less perfect in *Paphiopedilum* (*Cypripedium*) *Warszewickii* Pfitz., where the third stamen is absent, in *Ophrys apifera* Huds., where, according to J. E. Gray, if one finds in a peloric flower 2-3 fertile stamens, it is due to the development of one or two epipetalous rudiments in addition to the normal episepalous stamen. This abnormality has been taken for a species, *Ophrys Trollii* Reich., or a variety, *O. apifera* var. *friburgensis*. *Note*: In my copy of Col. Godfrey's *British Orchidaceae*, I find there are some beautiful coloured drawings pls. 57 and 58) of *Ophrys apifera* (Bee orchid), and *O. Trollii* (Wasp orchid), with a discussion as to the exact status of *O. Trollii*. This latter is now considered to be a variety of *O. apifera*. It is not a stable form, but varies according to the type of *O. apifera* from which it is a sport.

Dimerous (two members in each part) peloriae are a consequence of the suppression of the lip and of the connection of adjoining sepals in *Ophrys Arachnites* Hoffm. (Penzig), *O. Bertolonii* Moretti (Moggridge), *O. Myodes* Jacq. (Wydler).

"Masters mentions the abortion of the corolla in *Ophrys aranifera* Sm.; the three external stamens are fertile; actinomorphose (regular symmetrical pattern) is prevented only by the development of the stamen superposed to the abortive lip".

The foregoing discussion includes all I have been able to gather at the present time concerning peloria in orchids, but it is hoped that these data may suffice to give the reader some idea of the many and varied peloric forms that may be found in the Orchidaceae. In conclusion, I shall be glad to hear of any further cases that may be known of this rare phenomenon, more especially, in our native orchids.

Finally, my best thanks are due to all those kind friends who have helped in any way in the preparation of this paper.

THE STATUS OF THE FISHER, *Martes pennanti* (Erxleben), IN CANADA[1]

By A. L. RAND
National Museum of Canada

A DISTRESSFUL FUTURE for the fisher is forecast in Anderson's statement that "with every northern trapper after its pelt, unless the fisher becomes successfully acclimated on fur farms, this valuable species seems doomed to ultimate extinction" (1934, p. 4064). Allen (1942) includes the fisher in his volume on "Extinct and Vanishing Mammals .....". He lists state after state in the United States from which it is nearly or quite gone. Only in the Adirondack counties of New York state are these animals holding their own in spite of large catches (of up to 563 per year in the 1920-25 period). In eastern Canada Allen reports it as sadly depleted in recent years and only in British Columbia are they present in some numbers. In the 1936 report of the Department of Lands and Mines for New Brunswick the view is put forward that in a few years time the supply of important furs such as mink, marten, and fisher will be produced by fur farms.

However a survey of fisher status indicates that in Canada we still have a sizeable stocking of fisher in the wild, and though reduced from that number present in earlier times, the wild fisher should provide a perpetual supply of fine skins, if proper conservation is practiced. Fisher are being raised on fur farms, but as yet their yield of fisher fur is unimportant.

Ultimate extinction or relegation to captivity is a gloomy picture for any of our fur bearers, and the view that most of our fine fur be produced on fur farms overlooks the possibilities and resources of our vast land.

In evaluating the importance of the wild fur catch, it must be kept in mind, that over a large part of Canada the only economic products are from the wild life.

The figures from the Canada Year Book for 1942 are:-

Total land area of Canada	3,466,556 square miles
Total forest area	1,220,405 square miles
Unprofitable or inaccessible forest	450,000 square miles
Productive Forest	770,000 square miles
Agricultural land in Canada occupied and available (including grazing)	549,660 square miles

It appears that only about one-seventh of Canada is suitable for agriculture or grazing; that about one-third is forested; and about four-sevenths of Canada's surface is at present not exploitable for either timber, agriculture or grazing. This is an area of about 2,000,000 square miles. On this area our wild life, as game, food and fur resources, are the chief factors that can make the country economically productive.

The necessity of conserving the wild life on 2,000,000 square miles gives an idea of the magnitude of our problem in conserving these biological resources to insure maximum production.

Gone is the time when fur and timber were exploited like coal and iron deposits. These biological resources differ in being renewable. And as Dr. Camsell has wisely said (1942, *Canadian Geog. Journ.*, 25, pp. 3-11) the basis of future progress is present research. One of the first steps is to make an inventory and see where we stand. This paper is in the nature of an inventory as to the present status of the fisher.

In number of pelts the fisher does not bulk large in the total Canadian fur output. In the 1939-40 season the total fur take was 9,620,695 skins; of these the fisher contributed 2,886 pelts, or about 0.03% of the total number of skins. The average value of fisher skins in the ten year period was $48.92, with a range of average yearly price between $40.03 and $53.39. This high price makes the value of the fisher catch assume a larger share of the total. The 1940 value of the whole fur take was $16,668,348.00; that of the fisher $152,166.00 or about 0.90% of the total value.

1.—Received for publication January 27, 1944.

Comparing the fisher take with that of other furs, using 1939-40 season's figures; in total number of pelts taken the fisher stands nineteenth in the listed twenty-five "kinds" of wild-caught fur, falling just below the otter (10,917 skins), lynx (7,473 skins), wolf (6,429 skins), and badger (4,663 skins), while it is just above the blue fox (1,442 skins), wild cat (1,184 skins), black bear (1,037 skins), and wolverine (645 skins).

In total value the fisher stands fifteenth on the list, just below the coyote ($179,616.00), and the otter ($159,786.00) and just above the raccoon ($54,028.00), and wolf ($41,299.00).

In value of individual skins the fisher easily leads at $52.73, followed by the lynx ($35.70 per skin), marten ($30.13), beaver ($18.18), and silver fox ($15.43).

The larger skins of the males have coarse fur and these bring a much lower price than the small, fine-furred pelts of the females.

In recent years in northeastern British Columbia I heard of an Indian trading a big, coarse fisher skin for $12.00 at Lower Post; and talked with a trapper who had sold three for $50.00; but during this same period, small, fine fisher skins brought $75.00 to $100.00 apiece to the trapper. Seton (1929, 2, p. 459) records choicest fisher skins bringing $345.00 in 1920, presumably at a fur sale.

Most faunal papers state that an animal is rare or common, or some intermediate state. For an inventory that is hardly satisfactory. The chief figures available are the fur returns for the Dominion and for the provinces, published by the Dominion Bureau of Statistics. These give us the yield and an idea of the status of the animal. It is hoped that in future data will be available for smaller areas, and for individual trap lines, so that differences in density of population can be estimated.

In several of the annual reports of the Game Commission of British Columbia it is pointed out that the annual fur yield is not a good index to the status of the animals concerned. In a year when animals are plentiful, the price may be low and the trapper may take no more fur from his line than will pay his yearly expenses, conserving the rest of the animals on his trap line until prices are high[2]. Also in some sections heavy snowfall may restrict travel and cover traps, lowering the yearly take.

Factors such as these undoubtedly weigh the figures. But these figures still remain as the most satisfactory basis of comparison that we have.

The following are the data on the fisher take in Canada for the period 1920-21 to 1941-42 as prepared by the Dominion Bureau of Statistics:

Season	Number of Pelts	Average annual value per skin	Season	Number of Pelts	Average annual value per skin
1920-21	4,866	$58.86	1931-32	2,739	46.81
1921-22	5,680	74.45	1932-33	2,530	52.91
1922-23	3,976	69.84	1933-34	3.171	53.39
1923-24	4,158	70.07	1934-35	3,728	45.62
1924-25	4,230	48.46	1935-36	4,624	51.10
1925-26	5,899	37.27	1936-37	5,237	52.71
1926-27	7,893	51.32	1937-38	3,505	40.03
1927-28	8,641	57.35	1938-39	3,399	49.03
1928-29	6,606	60.12	1939-40	2,886	52.73
1929-30	4,274	56.32	1940-41	2,212	45.52
1930-31	3,282	$45.83	1941-42	3,408	48.21

The average annual catch for Canada for the period 1930-40 was 3,510 fisher skins; for 1920-30 it was 5,622 skins.

For comparing the present fisher status with its earlier abundance we have Seton's (1929, Vol. 2, p. 458) data that the Hudson Bay Company's collection of skins over the eighty-five year period 1821-1905 averaged 4,439 skins per year, with the poorest year reporting only 974 pelts, and the best 8,917 pelts. Seton also gives the data for other American Companies as averaging 4,224 skins a year for the seventy-one years 1821-1891 (from Poland's list). Thus the average annual catch of fisher for the United States and Canada for this nineteenth century period was only about 8,600 skins.

As a proportion of these skins came from the United States, we can assume that the 1930-40 annual average catch of fisher in Canada is not below half the average annual catch for Canada during the nineteenth century. This fifty percent decrease is not nearly as great as is the marten catch, over a similar period and is about the same proportional decrease as Seton (op. cit. p. 679) postulated for the otter.

2. —This is possible in British Columbia, where there are large registered trap lines. In areas where registered trap lines are small, or where there are none, this spirit of conservation is not found.

However, comparing the 1920-30 period with the 1930-40 period it is seen that in recent years there has been a marked decrease in the numbers of fisher pelts taken; the highest yield in the former period was over 8,000 skins; in the latter period only something over 5,000 skins; the averages show the same thing.

This indicates that the take of the fisher is greater than its reproduction. The decrease is continuing slowly though there is evidently a sizeable stocking of fishers left in Canada.

It might be thought that the take of fisher was influenced by prevailing prices; with higher prices the animals would be more sought after and the take larger. However, this does not seem to be the case, as may be seen from the above table.

Dominion Bureau of Statistics provides the following data on the fisher take by provinces for the years 1930-31 to 1939-40.

	30/31	31/32	32/33	33/34	34/35	35/36	36/37	37/38	38/39	39/40
New Brunswick	33	27	27	44	63	85	53	40	19	26
Quebec	589	458	411	503	627	879	1,816	1,195	1,194	797
Ontario	1,544	1,258	1,203	1,309	1,495	2,123	2,052	1,418	1,353	1,372
Manitoba	160	284	289	521	682	692	461	250	213	157
Saskatchewan	28	15	13	31	15	5	9	17	12	10
Alberta	17	22	4	21	48	61	37	17	—none—	
British Columbia	681	663	562	721	763	759	668	520	590	504
N. W. Territories	230	7	18	21	24	2	136	22	8	9
Yukon Territory	—	7	3	—	11	18	5	25	10	17

Comparing the returns by provinces with Anderson's (1934, fig. 14) map it appears that the stronghold of the fisher is not in the far west or northwest, but in the east, in Quebec and Ontario, with British Columbia in third place as a fisher producing area. In Prince Edward Island and Nova Scotia there are now no fisher; in New Brunswick they are restricted to the northern third of the province, in Quebec to the southwestern third; in Ontario they are practically extinct south of the French and Mattawa Rivers, (*Prov. Ont. Game Report* 1937-38), but occur over perhaps three-quarters of the province; in Manitoba the range includes most of the province except the southwestern quarter; in Saskatchewan only the northern third; in Alberta, about two-fifths of the north and extreme west; in British Columbia about ninety percent of the province. It barely enters the southern Yukon, and occurs in perhaps a tenth of the southern Mackenzie District.

The fisher range does not extend nearly as far north as that of its close relative the marten.

The favourite habitat of the fisher seems to be lower and wetter forest country than that favoured by the marten, and the forests of the eastern provinces are thus more suitable for it.

In northeastern British Columbia the trappers say that fisher and marten often occur together in the lower country, along the rivers, but that only the marten goes into the higher country. In this area trappers who take two to four fishers a year are thought to make very good fisher catches, and in areas where such catches are made fisher are thought to be as common as they are anywhere in the country.

Though the fisher is not uniformly distributed over its range, it is interesting to calculate the total population and the average density per square mile. The average annual catch for the decade 1930-31 to 1939-40 was 3,510 pelts, and as fisher seem to be slowly decreasing we may assume that the catch represents a third of the population.

This would give an average annual population of about 10,530 fisher in Canada. This works out at about one fisher to every 110 square miles of fisher range.

Not only do the fisher populations vary in space but they vary in time. The figures for the twenty-two year period corroborate the theory, pointed out by Hewitt (1921), that there are periodic fluctuations in numbers of the fisher; a cycle with about a ten year period.

Even where the total fisher population is probably less than 300, as in New Brunswick,

this cyclic fluctuation is still seen.

One result of this cyclic phenomenon is evident. During the next few years the fisher will increase somewhat, until about 1947 or 1948. Durng this period, comparing one season's take with that of the immediately preceding year, it might be assumed that the animal's status was improving. This would be fallacious. A year's returns should be compared with that of the corresponding year in the previous cycle of abundance. In the above table 1936-37 is comparable with 1927-28, i. e. 5,237 skins as against 8,641 skins; presumably 1946-47-48 should also be compared with them. After about 1948 the fisher catch will decrease in size again. Without change in the protection the fisher receives the catch will probably drop below that of 1932-33.

Allee (1938) has pointed out that there is evidence indicating that if animals become too scarce, they are biologically unable to increase in numbers. We do not know what this point is for the fisher, but let us see to it that the fisher does not reach this probable danger point.

Allen (1942, p. 181) suggests that the fisher's scarcity is due to it being a solitary animal with a large home territory; to its forest habitat being limited, and being reduced by fire and axe; and to its low reproduction rate, one to four young being born after an eleven months gestation period. Correlated with the long gestation period is the fact that the fisher may breed at one year of age, but not until its second year are the young brought forth. This last factor alone makes a considerable difference, giving a lower rate of increase when compared with animals bringing forth young at one year of age.

In 1912 but two fisher farms were in operation on the continent. The shyness and nervousness of the animals has resulted in difficulty in getting the animals to breed. But it has been done successfully (see Hall, 1942). In 1940 twenty-three farms raising fisher were recorded in Canada. They were distributed as follows: New Brunswick 1 (with 1 animal); Quebec 5 (with 16 animals); Ontario 6 (with 23 animals); Manitoba 4 (with 61 animals); and British Columbia 7 (with 76 animals). The number of fisher on fur farms at the beginning of 1940 was 139; in that year 48 young were born, and eight adults and five young died. Fourteen fisher were sold from fur farms in 1940, at an average price of $75.00. Ten pelts were sold from fur farms, at an average of $51.00. On Dec. 31, 1940 there were 177 fisher on fur farms, valued at $13,990.00 or nearly $80.00 apiece, (*Rept. on Fur Farms of Canada*, 1940).

On Dec. 31, 1941 there were only 145 fisher on fur farms in Canada; 15 animals and 15 pelts were sold from fur farms during the year, (*Rept. on Fur Farms of Canada*, 1941).

It appears that fur farms are not yet an important source of fisher fur.

CONCLUSIONS.

The fisher is one of our scarcest and most valuable wild-caught furs. It was never common and is slowly decreasing in numbers. However even now a sizeable stock of animals exists in the wild, a stock that deserves close attention. If it decreases much more it may become so scarce as to be unable to recover its number if given protection.

The total contribution of the fisher to the yearly fur output is so small that its temporary withdrawal from the fur trade for a few years, by protection, would work hardship on no one.

Though the total fisher yield is but a small portion of the total fur catch, the value of individual skins is such that a small increase in skins would mean a large increase in the value of the catch. One fisher skin might bring more than the average catch of a Nova Scotia trapper. The animal is worth strenuous efforts to increase its numbers, both for the substantial increase this would mean to trappers' incomes, and for the betterment of the status of the species in Canada.

The cyclic nature of its fluctuation in numbers suggests one type of management to enable the fisher to recover more quickly from periods of scarcity, and to provide a larger harvest over more years, in periods of abundance.

Fur farms are raising fisher, and successfully breeding them, but the yield from this source is as yet of little importance.

LITERATURE CITED

1921, Hewitt, C. G., The Conservation of the Wild Life of Canada, New York.

1929, Seton, E. T. Lives of Game Animals, Vol. 2, pp. 746, New York.

1932-41, Prov. of British Columbia, *Annual Rep., Prov. Game Commission, 1931 and following reports, Victoria, B.C.*

1932-43, Fur Production of Canada, Season 1930-31 and following reports to 1941-42, *Dept. of Trade and Commerce, Ottawa.*

1934, Anderson, R.M., The Distribution, Abundance and Economic Importance of the Game and Fur-bearing Mammals of Western North America, *Proc. Fifth Pacific Sci. Cong., Univ. of Toronto Press*, pp. 4055-4075.

1937, Ritchie, H. H., Chief Game Warden's Report, *76th Annual Rep., Dept. Lands and Mines, Prov. New Brunswick, year ending 31st Oct., 1936, Fredericton, N.B.*, pp. 31-35.

1938, Allee, W. C., The Social Life of Animals, New York.

1939, *Prov. of Ontario, 31st Annual Report, Game and Fisheries Dept., 1937-38 Toronto, Ont.*

1942, Allen, G. M., Extinct and Vanishing Mammals of the Western Hemisphere, *Amer. Comm. International Wild Life Protection, No.* 11, pp. 15-620.

1942, Camsell, C., Natural Resources and their Conservation, *Can. Geog. Journ.*, 25, pp. 3-11.

1942, Hall, E. R., Gestation Period in the Fisher, with recommendations for the Animals Protection in California, *Calif. Fish and Game*, 28, pp. 143-147.

1942, Report on the Fur Farms of Canada, 1940, *Dept. Trade and Commerce, Ottawa*, pp. 1-53.

1942, The Canada Year Book, Ottawa, (and earlier editions).

1943, Report on the Fur Farms of Canada, 1941, *Dept. Trade and Commerce, Ottawa*, pp. 1-33. (Mimeographed).

CURRENT LITERATURE

MALLARD IN BRITISH COLUMBIA.—

Mr. J. A. Munro has given us another intensive study (Studies of Waterfowl in British Columbia, Mallard, 1943, *Can. Journ. Research, D;* 21, pp. 223-260). The mallard is the most important duck in the province, in places its numbers exceed those of all other ducks combined, and in the "Coastal Plain" area in southwest British Columbia and northwest Washington there is concentrated the largest winter population on the Pacific Coast. In 1941 there was an estimated investment of nearly $2,000,000.00 in duck hunting equipment, and about $1,000,000.00 spent in duck hunting by 39,932 licensed hunters, who took an estimated 20,221 mallards. Despite the mallard bearing the heaviest hunting pressure, it is the only duck that has maintained its numbers, and has actually increased in the last twenty years.

Through an analysis of some 3,387 returns of over 17,000 mallards trapped and banded, of 218 stomach examinations, and many field notes, a wealth of information is presented, from which may be noted that mallards nest over most of the province in a variety of habitats; there are populations that migrate differently, and one probably does not migrate at all; some units of population remain together over a period of years; the arrival of the main fall flight in the Coastal Plain is determined by temperature changes. The time of breeding varies with the locality, being later inland and northward. Eating of shot may be a restrictive factor, but some birds apparently build up a resistance to lead poisoning; agricultural expansion especially grain growing, has had a beneficial effect on the mallard. The food may be nearly all animal, in which salmon eggs may bulk large, or plant such as weed seeds, aquatic plants, or grain. Mallards may conflict with agricultural interests by destroying forage plants in flooded fields, but do little damage to grain; the salmon-egg destruction is probably unimportant.

The data presented are not correlated with a vast amount of similar work done in other areas. — A. L. RAND.

GLEANINGS FROM THE NATURAL HISTORY OF HURON COUNTY, ONTARIO*

By C. H. D. CLARKE
Ottawa, Ontario

IT WAS my privilege to live in Huron County, Ontario, from early July, 1921, to early September, 1927, at first in the village of Brussels and later, after July 1925, in the county town of Goderich. Since my residence terminated I have been back frequently and regularly. During both residence and subsequent visits a comparatively large amount of time has been devoted to natural history, and gleanings from the notes accumulated are not without interest. Bird notes were made available to J. L. Baillie Jr. and Paul Harrington for the compilation of records later summarized by them in "The Distribution of Breeding Birds in Ontario"[1]. I am repeating two published notes in order to add to them. Special attention is given to changes that have occurred from 1921 to the present.

Huron County is intensively farmed but has neverthless many woodlots and several good bush areas. The western fringe is a plain, the bed of post-glacial lake Algonquin. East of that is a wide hilly zone which is part of the "Horseshoe Moraine" system of southern Ontario. The eastern fringe of the county, farthest inland from Lake Huron, is part of a flat plain, formerly a cedar swamp known as the "Queen's Bush", the source of the Maitland and Bayfield Rivers. Now it is perhaps the least wooded portion of the county and with its clearing three generations ago the river beds became mere conduits for the spring run-off, except where damned at grist mills. The tulip tree, flowering dogwood and sassafras reach their northern limit at Bayfield[2], and the sycamore stops at Goderich. On the other hand the balsam fir just enters the county along the Bruce boundary. I know of no clumps of native spruces, but larch is not uncommon in swamps. In general, white cedar covers the swamps and river banks and sugar maple and beech crown the morainic hills.

Notes selected refer to the following species:

Coyote, *Canis latrans*. - This species must now be considered a resident, still not common. So far as I know, the first one taken was killed in 1936, and one or two have been reported killed every year since. I have not yet seen one.

Porcupine, *Erethizon dorsatum*. - During my residence at Brussels porcupines, though seldom seen, were frequently reported, chiefly on the evidence of quills in the mouths and noses of dogs. The species may justly be described as occurring rather uncommonly in cedar swamps in north Huron. One once wandered into the town of Goderich but I have not heard of any farther south.

Varying Hare, *Lepus americanus*. - Varying hares are abundant in cedar swamps in north Huron. I know of no occurrences at Goderich and they are probably scarce or absent in south Huron. On or about September 1, 1923, I saw a black individual at Brussels.

European Hare, *Lepus europaeus*. - I first saw this species at Brussels on December 19, 1924. It was already established at Goderich when I went there in 1925. Since 1926 it has been abundant and large numbers are taken in organized cross-country sweeps.

Elk, *Cervus canadensis*. - The Goderich "Signal-Star" of December 21, 1939, recorded an elk seen with some deer, in the Saratoga swamp near Dungannon, on December 14, 1939. It had evidently strayed from the Bruce peninsula, where elk were released by the provincial authorities. No subsequent observations have been reported.

White-tailed Deer, *Odocoileus virginianus*. - In 1921 deer were to be found near Brussels in both Morris and Grey townships. I was given to understand that they were rare and had

*. —Received for publication January 18, 1944.

1. —**Trans. Royal Can. Inst.**, vol. 21, pt. 1, 1936, pp. 1-59 and vol. 21, pt. 2, 1937, pp. 199-283.

2. —cf. John Gibson and John Macoun, "The Botany of the Eastern Coast of Lake Huron", Can. Journ. reprint, 1874-5, pp. 1-14.

been so for years, but that they had never been extinct. I had seen no sign of a deer when I left Brussels in 1925. However, reports of deer were becoming more and more frequent. In June, 1931, I was astonished to find unmistakable deer crotels in a small and isolated woodlot near Goderich. Since that time deer have increased rapidly and the Goderich "Signal-Star" was able to report the observation, on March 24, 1939, of 72 individuals at one time in the Saratoga swamp. The numerous cedar swamps of the county furnish abundant winter range, and I have so far seen no sign of over-grazing. This will come in due course if the deer increase continues unchecked. A short open season in 1942 aroused a storm of protest. I have noticed that a cedar swamp too small to hold varying hares will winter three or four deer over a period of years without over-grazing.

Black-crowned Night Heron, *Nycticorax nycticorax*. - On October 18, 1924, early in the evening, a flock of about 30 night herons flew over Brussels, headed southward.

Blue Goose. *Chen caerulescens*. - On November 15, 1925, I shot a blue goose at Goderich. On October 26, 1935, and (from reports) early in the same month of 1936, enormous numbers of geese, undoubtedly blue and snow geese, flew over Goderich at night in migrations that took most of the night to pass[3].

Buffle-head. *Charitonetta albeola*. - Flocks of buffle-heads were seen regularly at Brussels in both spring and fall migrations. While the numbers were not large, this species was the commonest migrant duck, a rather unusual condition.

Turkey Vulture. *Cathartes aura*. - The turkey vulture is said to nest in Huron County[4]. I saw four at once at Bayfield on May 23, 1939, and learned of one shot at Brussels prior to 1921.

Sharp-tailed Grouse. *Pedioecetes phasianellus*. - On April 5, 1926, I saw at Goderich what I was certain was a sharp-tailed grouse. This record is one that I was tempted to suppress until, years later, I learned that fifty live sharp-tails had been shipped from Wainwright, Alberta, to Eugenia Crown Game Preserve in Grey County, on March 30, 1923. Obviously the introduction was a failure, for passing years have brought no evidence of the establishment of sharp-tailed grouse in this region. However, it makes my record look more reasonable, even if at the same time it deprives it of any great significance.

Upland Plover. *Bartramia longicauda*. - This species has always been more or less in evidence. On June 3, 1936, and since, I have examined many miles of the flat fields of the old Lake Algonquin bed north of Goderich and found this bird well distributed, though hardly to be called abundant.

Iceland Gull. *Larus leucopterus*. - On December 21-23, 1935, an Iceland gull was seen at Goderich harbour. There was ample opportunity to compare it with both herring and ring-billed gulls.

Bonaparte's Gull. *Larus philadelphia*. - This species is extraordinarily abundant in both spring and fall migration at Goderich, and stays late in fall, e.g. December 23, 1935, December 24, 1939 and December 26, 1941.

Snowy Owl. *Nyctea nyctea*. - In 1927, after the ice disappeared, carcasses of snowy owls washed up along the shore of Lake Huron. I saw some at Goderich in spring and in Bruce County in summer. A single living straggler was seen at Goderich on May 27, 1927, headed north.

Belted Kingfisher. *Megaceryle alcyon*. - This species wintered at Brussels in the very open winter of 1922-3.

Red-headed Woodpecker. *Melanerpes erythrocephalus*. - When I first knew Huron County red-headed woodpeckers were common. There may still be a few, but I have seen none since 1929. The arrival and spread of the starling may or may not have had something to do with the disappearance of the red-headed woodpecker. One individual, perhaps more, wintered at Brussels in the winter of 1922-3.

Short-billed Marsh Wren. *Cistothorus stellaris*. - I observed this erratic species only in 1931, when there were two separate colonies at Goderich during the nesting season.

Starling. *Sturnus vulgaris*. - The first starling that I recorded was seen at Goderich on November 29, 1925[5]. Its increase was rapid and now it nests all over the countryside. The wintering population has not grown since the early years of its occurrence, hence most of the nesting birds must be migrants.

3. —cf. L. L. Snyder and T. M. Shortt, **Auk** 53 173-177, 1936.

4. —cf. Baillie and Harrington, **op. cit.**

5. —cf. H. F. Lewis, **Univ. of Toronto Studies, Biol. Series** No. 30 1927.

Cardinal. *Richmondena cardinalis.* - I saw individual males at Goderich on November 9, 1925, and December 27, 1928. In 1937 the cardinals arrived to stay. I saw them on April 3 of that year and have seen them on every subsequent visit. Small flocks have been reported in winter and there are reports of nests, undoubtedly true though unverified.

Grasshopper Sparrow. *Ammodramus savannarum.* - My first observation of this species was in June, 1931, (first seen June 9), when there were two thriving colonies at Goderich It was not seen again until May 27, 1939, when a site near one of its former stands was occupied. On June 4, 1943, it was back again in the same general area.

Henslow's Sparrow. *Passerherbulus henslowi.* - On June 4, 1943, this species was observed in the same meadow as the grasshopper sparrow, at Goderich. There were at least two singing males.

Clay-coloured Sparrow. *Spizella pallida.* - On June 4, 1931, I found a male clay-coloured sparrow at Goderich in the restricted locality already mentioned as frequented by grasshopper and Henslow's sparrows. It was observed until June 8 and then collected[6]. On May 26, 1939, another singing male was discovered in the same vicinity.

Song Sparrow. *Melospiza melodia.* - At Brussels first nestings of song sparrows seen by me all had clutches of six eggs; at Goderich all had four eggs. At this date I am unable even to guess the number of nests observed, but the information may have some interest.

Smelt. *Osmerus mordax.* - In 1906 and 1909 the smelt was introduced into the upper Great Lakes at Sault Ste Marie, Michigan[7]. Since that time it has been spreading around Lake Huron and the Goderich area seems to have been one of the last places reached. In 1939 a run started at Port Albert, but the Bayfield River seems to have had no smelt in 1940 and possibly none until 1942. In 1943 the Port Albert run is reported to have been very poor.

The Goderich "Signal-Star" of April 25, 1940 contains an account of the "second annual smelt harvest" in the Nine Mile River at Port Albert, and estimated that "last night" 150 persons had taken two and one half tons of smelts, using a variety of methods including scooping them out with bare hands. Smaller catches were said to have been made in the Maitland River at Goderich.

6. —cf. Baillie and Harrington, **op. cit.**

7. —cf. North Bay "**Nugget**" June 19, 1936.

CURRENT LITERATURE

MELLON CARNEGIE MUSEUM EXPEDITION TO THE MACKENZIE DELTA, *by Arthur C. Twomey. The Carnegie Magazine, Vol.* XVII, *Nos. 4 & 6, pp. 99-110 and 179-187 (1943).*

Dr. Twomey who is Assistant Curator of Ornithology of the Carnegie Museum, Pittsburgh, is well-known to Canadian ornithologists for his work in Hudson Bay and Ungava and for his book "Needle to the North" (in collaboration with Nigel Herrick).

In the Carnegie Magazine Dr. Twomey gives an interesting preliminary account of the Mackenzie Delta, N.W.T., its people and its wild life. He travelled to the Delta by air, in March 1942, accompanied by Mr. Bert Wilk, a student at the University of Alberta. Headquarters were established at Aklavik where he spent ten months making numerous trips by canoe or by dog team. Of particular interest is his account of a trip to the breeding grounds, of the snow geese, on islands off the Delta, and of a white whale hunt. In July Mrs. Twomey joined the expedition.

The article is profusely illustrated by excellent photographs by the author. A sketch map of Canada shows the route of travel. — A. E. PORSILD.

THE RECENT STATUS OF NOVA SCOTIA FUR BEARERS [1]

By A. L. RAND
National Museum of Canada, Ottawa

A BRIEF SUMMARY of the status of Canadian fur bearing animals up to about 1930 was given by Anderson (1934). A similar paper was originally planned to survey the fur bearers of the dominion as a whole, over the ten-year period 1931-40. However, as material has accumulated, it seemed advisable to present these data for each province separately.

Nova Scotia has long since passed the stage where fur is thoughtlessly exploited, and the period under review may be taken to represent the beginning of an era of fur management and harvesting. With present war conditions and man power shortage, the trapping pressure on fur bearers must be decreasing. This means that after the war there should be a substantially increased stock to use in future management; an opportunity to be utilized.

To help in this a solid basis of comparison, species by species, year by year, and area by area, must be had, so that experience can be most effectively brought to bear on the future. Ideally, we should know the animal population per square mile, estimated from sample counts; or even the number of trap nights per animal; that is the number of nights it is necessary to set a trap to catch an animal of any particular species. In the future such data will be accumulated. But for the present we have the annual fur yield of the province, gathered from the royalty returns; occasional statements as to the general abundance of the animals and the number a man caught in a winter. (May we have more of them). The data have been brought together from the Reports of the Nova Scotia Department of Lands and Forests (quoted as Prov. Rep.), a mimeographed release from the National Parks Bureau, the files of the National Museum, and various publications, to give a record of the status of the animals, and to clarify some of the points involved in recording and calculating the density of fur populations.

1. —Received for publication January 27, 1944.

The fur returns for the provinces include both wild-taken and ranch-raised pelts. As this lumps the returns from two industries, trapping and fur-farming, that are as different from each other as are lumbering and farming, it was necessary to calculate the wild-taken total. A number of factors make the correlation between the wild-taken and ranch-raised fur difficult to establish. This is what has been done. All Silver and Cross Fox have been excluded from the calculations of the wild catch, though a few may have been wild-taken. Obvious exotics such as Badger, and completely protected species, such as Beaver and Marten were excluded. These last, if Nova Scotia taken, obviously are confiscated skins bringing in no returns to the trapper; they are mentioned under the appropriate species. For the rest I have subtracted from the total yield of the province for each species the number of animals of that kind killed for their pelts on fur farms. The importance of this is particularly apparent in the Mink returns; in 1939-40 the total yield was 10,598 pelts; 8,986 animals were killed for their pelts on fur ranches; the adjusted figure of 1,612 pelts was taken to represent the wild-taken yield for that year.

AREA AVAILABLE FOR FUR BEARERS AND YIELD

In 1931 the total forested land of the province was estimated at 15,220 square miles, out of a total land area of 20,743 square miles. That is, about three-quarters of the province was forested. All this forested land, and also some of the farm land and marshes are potential fur producing areas. This use does not interfere appreciably with other pursuits.

A considerable part of the province is apparently suited for little but a game and fur crop. About one-third of the forested area, (or one-quarter of the province) is classed as covered with unprofitable or inaccessible forest; over a third of the whole province is estimated as being unsuitable for agriculture.

Thus there is this one-quarter to one-third of the province with game and fur as its main asset.

To get a basis for comparison with other areas, the value of the fur yield per square mile of forest land can be calculated. As some wild fur will be produced on farm land and marsh, the figures given may be slightly high. The average annual value of the yield per square mile of forest over the period is just under $7.00; the highest yield was about $10.00 in 1936-37; the lowest in 1933-34 when it was under $4.00 per square mile of forest.

TOTAL AND RELATIVE VALUES OF FUR BEARERS

The annual total value of the wild-taken furs varies greatly from season to season. In the period under review it has ranged from $56,761 in 1933-34 to $158,501 in 1936-37, depending on both variations in the catch, and in the price of fur.

The average annual value of the catch was about $95,000.00. The average annual value of the wild-taken furs in Canada for the same period was about $8,614,000.00, Nova Scotia thus contributing about 1.1% of the total. Compared with the whole of Canada, Nova Scotia's area is about 0.6% of the total. That is, from 0.6% of the land surface, Nova Scotia produces 1.1% of the fur crop.

In the density of population, Nova Scotia has about twenty-three persons to the square mile. Only Prince Edward Island exceeds this. New Brunswick has about fourteen, Ontario eight, and all other provinces less than four persons to the square mile. Thus in spite of being comparatively thickly settled, a condition inimical to many wild animals, Nova Scotia produces for her area a high percentage of the fur crop.

The various species, arranged in the descending order of their importance to the fur trade based on the average annual value of their fur, with average catches for a ten and a twenty-five year period follow (Table 1).

TABLE 1

Animal	Average annual value of catch	Average annual catch, 1931-40 (10 years)	Average annual catch, 1910-34 (25 years)
Muskrat	$38,636.00	38,289	23,491 pelts
Mink	27,836.00	2,404	2,600 "
Red Fox	13,513.00	1,437	1,555 "
Weasel	4,977.00	10,143	9,825 "
Raccoon	4,666.00	1,250	1,037 "
Wild Cat	2,065.00	552	514 "
Otter	1,579.00	92	99 "
Squirrel	892.00	10,576	———
Lynx	482.00	22[1]	31 "
Skunk	316.00	406	2,019 "
Black Bear	18.00	8 [2]	———
Total	$94,980.00	65,179	41,171 pelts

1. —However, see under lynx.
2. —However, see under black bear.

However too many conclusions should not be drawn from the gross annual averages of pelts taken. It would appear that the number of pelts had increased about 50% in the last ten years. But this is due almost entirely to recent addition of the squirrel to the list of fur bearers, and the increase in the muskrat take. The ten year average of the lynx also does not give a true picture of its status; nor do the bear figures. These are discussed under the headings of the animals concerned.

Listed in order of value of the individual pelts, averaging the average value for each of the ten years 1931-40 gives a quite different order (Table 2).

TABLE 2

Animal	Average value per pelt	Extremes		
Lynx	$21.60	$18.00	(1932-4)—	$28.00 (1931-2)
Otter	17.45	30.00	(1933-4)—	10.00 (1939-40)
Mink	11.38	18.25	(1936-7)—	8.00 (1938-40)
Red Fox	9.95	20.00	(1930-1)—	5.00 (1939-40)
Wild cat	4.16	2.50	(1938-9)—	10.63 (1931-2)
Raccoon	3.90	7.00	(1930-1)—	2.00 (1933-4) (1938-9)
Black Bear	2.60	7.00	(1931-2)—	1.00 (1939-40)
Muskrat	.96	1.60	(1936-7)—	.50 (1933-4)
Skunk	.80	1.20	(1931-2)—	.35 (1932-3)
Weasel	.45	.75	(1930-2)—	.30 (1938-40)
Squirrel	.07½	.12	(1936-7)—	.01 (1931-2)

The order in which these animals arrange themselves on the basis of total number of pelts taken is quite different again, as may be seen from the earlier table, and is as follows:

Muskrat, Squirrel, Weasel, Mink, Red Fox, Raccoon, Wildcat, Skunk, Otter, Lynx, Black Bear.

NUMBER OF TRAPPERS

During the period 1930-36 a license was required of every trapper.

The number of licenses issued for those years is as follows:

1930-31	3474
1931-32	3230
1932-33	2313
1933-34	1678
1934-35	2402
1935-36	discontinued

Comparing the number of trappers in 1930-31, 3474, with the number of gainfully employed persons, which was probably about 170,000, it is evident that only about two percent of the gainfully employed persons were engaged in trapping.

Of the gross net primary production in Nova Scotia valued at $94,507,795.00 in 1931, $231,138.00 or about 0.24% is listed as due to trapping. My calculations of the value of the 1930-31 catch, based on the total fur yield minus the ranch furs is $105,219.00 or about 0.1 percent. This year was a somewhat better than average trapping year.

In this same year each trapper averaged about $32.00 of the total wild catch.

However it must be remembered that almost all of these trappers are part time trappers only. Farmers, boys and various rural part-time workers add to their income by trapping. Thus it is possible that trapping is more important than the figures show. Trapping, plus other part-time activities enable families to make a living where otherwise it would not be possible.

CONSERVATION

Marten and beaver enjoy complete protection. Bears and wildcats have no protection and local bounties have been paid; the squirrel, a newcomer to the fur list, has had no protection and earlier, bounties were even considered. Most other fur bearers have had an open season in late fall and winter during the period under review. A spring muskrat season was tried in 1931, but next year the season was changed back to correspond with the season for other fur. Certain practices such as poisoning and molesting muskrat houses were forbidden.

In addition to this passive protection, four provincial game sanctuaries have been established, and one national park. These are listed below, with date of establishment, location and area (Table 3).

TABLE 3

Name	Established	Approximate area	Location
Tobeatic Sanctuary	1927-28	200 sq. mi.	Junction of Annapolis, Digby Yarmouth, Shelburne and Queen's Co.
Liscomb Sanctuary	1927-28	200 sq. mi.	on border of Halifax and Guysboro Co.
Waverley Sanctuary	1929	15,000 acres	Halifax County
Chignecto Sanctuary	1938	85 sq. mi.	Cumberland County
Cape Breton Highlands National Park	1936	390 sq. mi	north Cape Breton Island

The sanctuaries were established especially for the management of the moose, and predatory control has been carried on, but they could, and for some species have, served as reservoirs of fur bearers. The records of the wardens as to conditions on these sanctuaries should serve as very important data in considering further conservation measures.

The National Park of course supplies complete permanent protection to almost all land animals.

The fisher and the wolf have long since disappeared from the province. The most recent data on the marten indicate that it may survive permanently in the National Park; some were present in Liscomb Park but we have no recent information as to their status.

The beaver has received much attention with gratifying results. Complete protection, sanctuaries and plentiful plantings of animals from areas within the province where they had become plentiful has raised their numbers to where the province is actually looking forward to harvesting some of them in the near future.

It seems probable that with additional active conservation, based on observations and study, and perhaps including more sanctuaries; changes of seasons depending on the yearly conditions of the populations; and manipulation of cycles, that a considerably higher yearly take of fur can be harvested.

CYCLIC FLUCTUATIONS

Thanks to the work of Seton, Hewitt, and Elton it is well established that many animals have recurring periods of abundance and scarcity. Elton has also suggested (1942 lynx paper) in relation to the lynx and marten that over-trapping or other human activities might lower the whole population level to a point where cycles no longer occur.

In Nova Scotia during the period under review the snowshoe rabbit show tremendous fluctuations, with higher population levels in the period 1930-32; low 1933-36, and increasing to plentiful in 1938-39.

As would be expected, the lynx follow the rabbit cycles. Despite the low ebb reached in Nova Scotia, where only two were taken in the poorest season, 1934-35, the cyclic fluctuation is very pronounced.

There also appears to be a very pronounced fluctuation in muskrat populations (see under muskrat), and in weasels, the latter with a shorter period than in the rabbit and lynx. It is probable that the red squirrel will also show regularly recurring periods of abundance and scarcity.

Hewitt also shows fluctuations for fox, marten, mink, otter, skunk, black bear, raccoon and beaver. Our Nova Scotia figures except possibly for the skunk, do not give us much indication of this.

The causes of this cyclic phenomena are unknown, but an understanding of this occurrence is essential in understanding and managing the animal populations concerned. Periods of abundance when greatly increased catches may safely be taken, are followed by periods of scarcity when small or no catches should be taken. It has not been found possible to eliminate cycles, even on game species that have been closely studied, but it has been found possible to speed the recovery from low periods of abundance.

COMPARISON OF ABUNDANCE, PAST AND PRESENT

I have not searched old records for former abundance, but in the Province of Nova Scotia Annual Report of the Department of Lands and Forests for 1931, p. 83, are the statements that the export of fur from Nova Scotia has dwindled enormously; that the province could produce many times more fur than it does at the present time; and that the diminution of the fur catch is due to excessive trapping.

In the report in the same series for 1937, the available records of yearly take of the principle fur animals, from 1910 to 1934 are averaged. The twenty-five year average is presented in the above table and also the ten year average for 1931-40.

From this it appears that the present take of most fur animals is about the same as during the period back to 1910. Many fur bearers seem to have been stabilized at a low level of abundance. The marten is an exception that was threatened with extinction, and the beaver was the same, but due to management has increased.

Having pointed out some of the general trends and correlations in trapping and the fur bearer populations, it should be stressed that each species must be considered separately. For example even closely related species, such as the lynx and the wildcat, behave very differently. The lynx fluctuates violently in numbers along with the rabbit; the wildcat does not.

Below are the discussions of the various species.

Black Bear. *Ursus americanus* Pallas.-

In Canada the black bear will be long with us (Anderson, 1934, p. 4063). In Nova Scotia it is a shy animal of the forest, but has a predilection for sheep and hogs that has placed local bounties on its head, and habits of smashing canoes and breaking in windows, and tearing off roofs of cabins, as in Tobeatic Sanctuary in 1931 that brought it into greater disfavour.

Bears not only receive no protection, but many municipalities offer bounties on bear. I have no details of these, but in 1942 when the Province took over paying bounties these ranged from $2.00 to $25.00 per bear, and a total of $1,030.00 was paid in bounties.

Bears were common in all the more unsettled parts of the province (Smith, 1940, p. 225). They were fairly abundant in the wildest part of the Kedgemakooge area, where the natives trapped them for their bounty

(Sheldon, 1936, p. 210), and quite common in interior Annapolis County (Rand, 1933, p. 45).

In Cape Breton Island in 1924 and 1935 bears were fairly common in all parts of the Cape Breton Highlands National Park area (Anderson, 1941). In 1941 Clarke found "a fair remnant of bears" in this park. He says they are increasing and that this will continue. He also warns that they will do some damage to stock, as they increase and become bolder with protection.

In Tobeatic Sanctuary in 1930-31 bears were very numerous. Apparently they had increased considerably since the establishment of the Sanctuary in 1927-28. They were causing some concern because it was thought they were preying on moose and deer. Though no carcases definitely killed by bear were found, deer and moose hair were found commonly in bear droppings. This probably was from carrion. However the decrease in moose calves seen in 1932 was tentatively referred to bears. In addition the bears were doing damage to the wardens' canoes and cabins, and in 1932, six, and in 1933, fifteen bears, all but two of them females, were trapped in this 200 square mile sanctuary. Since then no details are available, but in 1934 there was reported a number in the parks but not causing any concern. In 1936 and 1938 bears were less common in the sanctuaries than in previous years. (Reports, Dept. Lands and Forests, N.S. 1931 to 1940).

The pelts exported for the period under review are as follows:

1930/31	14	1935/36	3
1931/32	2	1936/37	17
1932/33	10	1937/38	10
1933/34	7	1938/39	2
1934/35	8	1939/40	3

From the above figures it might be assumed that the bear is almost gone in Nova Scotia. But the figures give no indication of the real status. This is well indicated by the figures for 1942, when the province paid the bounties; they were paid on 132 bears, but only six pelts appeared in the fur statistics. The small value of the skin does not make it worth while to prepare the bulky, greasy hides.

In a country where many small farms raise stock on the edge of the forest the bear's depredations weigh heavily against its food and game value.

But even under a continual open season and bounties the bear seems to have persisted fairly commonly.The Park in Cape Breton Island provides permanent sanctuary, and the sanctuaries are managed game areas where some bears should be sure of protection.

While a discussion of fur bearers is hardly the place to elaborate the game value of the bear, it should be pointed out that in some parts of the United States, as Pennsylvania, the bear is considered a game animal and it is estimated that for every bear killed, sportsmen spend $5,000.00 in travel, lodging, clothing, ammunition, etc.

This aspect of the bear needs consideration, in planning any conservation scheme.

American Beaver *Castor canadensis* Kuhl. -

The beaver has not only enjoyed complete protection over this period, and the advantage of sanctuaries closed to hunters and trappers, but has been the object of much care and many introductions.

The rigor with which beaver are protected is seen by such items in the list of prosecutions as "Having beaver pelts in possession, fined $1,000.00"; "Having a beaver pelt in possession, fined $100.00" (Rept. Dept. Lands and Forests, Nova Scotia, 1933, p. 58), and 12 charges against an individual, each for buying a beaver pelt, and a fine of $250 00 on each charge, (Rept. Dept. Lands and Forests, Nova Scotia, 1940, p. 58). This certainly takes the profit out of such illegal traffic. Occasional beaver pelts that appear in the fur statistics are presumably seized skins from such sources.

Smith (1940, p.232) writes that the beaver inhabits the western part of the province. In Annapolis County Rand, 1933, p. 47 records it as fairly common. Anderson, 1941, does not mention it for Cape Breton Island, nor does Clarke, 1942, list it for that area before its re-introduction.

The Reports of the Department of Lands and Forests of Nova Scotia contain many details of the restocking program, and in the 1941 issue there is a map showing beaver introductions from 1934 to 1941.

In 1931 beaver were restricted to the western point of the province, but were increasing in Tobeatic Sanctuary and their future in western Nova Scotia was assured. In that year, five beaver were liberated in Waverley Park. The next year eleven were liberated in

Liscomb Park. Since then from 1934 to 1940 some 150 animals have been liberated in various parts of the province, from Chignecto and Waverley Sanctuaries to Cape Breton National Park. These were apparently beaver from the western part of the province.

The beaver has done so well that in 1941 the Report of the Department of Lands and Forests carried the statement "in the near future it will be possible to have a short, well-regulated open season.....".

Raccoon. *Procyon lotor* (Linnaeus).-

The raccoon is fairly common in the Annapolis Valley, and is found occasionally throughout the interior of the mainland, Smith, 1940, p. 225. In interior Annapolis County it was said to be fairly common, but taken only occasionally; in the Kedgemakooge area Sheldon (1936) does not mention it. Neither Anderson nor Clarke mention it in Cape Breton Island. However the fur returns for the period 1933-41 by counties show that the raccoon is well distributed over the mainland and that forty-seven pelts were exported from Cape Breton County, and fourteen from Inverness County (Prov. Repts.).

The 1933 report of the Department of Lands and Forests N.S., states the raccoon is occasionally seen in Waverley and Liscomb Sanctuaries as in the past few years, but there appears to be no increase. In that year there was the first record for Tobeatic Park.

The fur returns for the period are:

1930/31	929	1935/36	1024
1931/32	1032	1936/37	1787
1932/33	991	1937/38	1666
1933/34	1409	1938/39	1140
1934/35	1205	1939/40	1311

The average for this ten year period is 1,250, while that for the twenty-five year period 1910-34 is 1,037 pelts.

Raccoons appear to be maintaining their numbers.

Since raccoons are not at all uniformly ditributed no density can be calculated, but using 20% of the fall population as the annual kill, the average population during the ten year period was 6,250 animals.

American Marten. *Martes americana* (Turton)

The marten has complete protection the year round; one skin, exported in 1931-32, may have been a confiscated pelt.

Smith (1940, p. 226) considered that though the marten was rare and approaching extinction, it might persist for some years in suitable habitats. In Annapolis County Rand (1933, p. 45) heard of a skin being taken some years earlier. In Liscomb Park, provincial wardens in 1930-31 and 1931-32 reported a few marten tracks seen each winter, but that they do not seem to increase. No later details are available. (Rept. Dept. Lands and Forests, N.S.). In the Cape Breton Highlands National Park area a few marten still existed, although close to extinction in most parts of the province in 1935 (Anderson, 1941). When Clarke surveyed the Park in 1941 he reported that Warden John Roach has seized two marten pelts at Cap Rouge before the park was established, and that Roach believed there was a good nucleus of breeding stock in the park. Two tracks were reported seen near the park in the winter of 1940-41.

The marten is a widely ranging, easily trapped animal. Large sanctuaries seem the only chance of preserving it. It seems probable that it will persist in the Cape Breton Park.

Mink. *Mustela vison* Schreber.-

The mink was fairly common in the interior of the province where lakes and streams abound (Smith, 1940, p. 227). It was very numerous about the shores of the lakes in the Kedgemakooge area (Sheldon, 1936, p. 210); and fairly common in interior Annapolis County (Rand, 1933, p. 45). In Cape Breton Highlands National Park area it was fairly common (Anderson, 1941 and Clarke, 1942).

The Reports of the Nova Scotia Department of Lands and Forests give the mink as increasing in eight of the ten years, in some parts of the province at least, though this is not evident from the fur returns below:

1930/31	2149	1935/36	2512
1931/32	3365	1936/37	2564
1932/33	2130	1937/38	2633
1933/34	2963	1938/39	2320
1934/35	2695	1939/40	1612

These figures indicate no cyclic fluctuations.

The average catch for this ten year period was 2,404 pelts; for the twenty-five year period 1910-34 it was 2,600 pelts.

Mink thus have shown a slight decrease in numbers in recent years, but is nearly holding its own.

If about one mink in five is caught each fall, the total population in the season of 1931-32 would have been about 16,800 animals giving a density for the forested portions of the province of slightly more than one mink to the square mile. This is below Seton's guess of a pair to the square mile in Manitoba, but is better than some estimates for the National Forests of Washington and Oregon, of about one mink to each two and a half square miles. (Seton, 1929, 2 pp. 526,7).

That the mink respond readily to protection is well shown by the provincial reports. Previous to the establishment of the Waverley Sanctuary in 1929 mink were scarce in that area. In 1930 only two mink tracks were seen in the period from Jan. 1 - March 1, while in 1931, eighteen mink tracks were seen in the week March 1-6.

Short-tailed Weasel *Mustela cicognanii* Bonaparte.-

The numbers of this animal fluctuate from year to year; in 1929 it was scarce in the province, along with other fur-bearers; gradually it increased and in 1934 and 1935 it was fairly numerous, and by 1937 was scarce again (Smith, 1940, p. 226). In the Kedgemakooge area trappers often take them in winter (Sheldon, 1936, p. 210); in interior Annapolis County it was tolerably common (Rand, 1933, p. 45); in the Cape Breton Highlands National Park area it was fairly common in 1935 and 1941 (Anderson, 1941, Clarke, 1942). The reports of the provincial wardens give few details, but give the weasel as scarce over the whole period, doubtfully increasing in 1932 and 1933 and increasing in 1940.

The fur returns for the period are as follows:

1930/31	16466	1935/36	9790
1931/32	14178	1936/37	15448
1932/33	8205	1937/38	9472
1933/34	6135	1938/39	7541
1934/35	6469	1939/40	7729

The average take over this ten-year period was 10,143; for the twenty-five year period 1910-34 was 9,825 pelts.

These figures show a striking fluctuation in numbers, but they do not correspond with the periods of abundance and scarcity as recorded by Smith. It appears that there may be cycles in abundance of weasels, with a shorter period than the lynx and rabbit cycle.

Comparing the present with the earlier fur catches back to 1910 it appears that the weasel is about holding its own in recent years.

The weasel ranges wherever there is cover, so is found over practically the whole province. If we consider that perhaps one in five weasels is trapped each fall, the total weasel population would have been as high as 82,330 animals in the fall of 1930. This would give a density of about four animals to the square mile. Soper, in Northern Alberta in 1912-14 found this weasel to average about nine to the square mile. (Soper, 1919).

Otter *Lutra canadensis* (Schreber).-

It frequents the lakes and streams of the interior throughout the province (Smith, 1940, p. 227). In interior Annapolis County they are not common (Rand, 1933, p. 46); almost unknown about Kedgemakooge Lake, but occurs to the west (in the Tobeatic Sanctuary) (Sheldon, 1936, p. 211). It is rare in the interior of Cape Breton Highlands National Park area (Anderson, 1941) but is probably well distributed in the park (Clarke, 1942).

The fur returns for the period are:

1930/31	93	1935/36	107
1931/32	96	1936/37	79
1932/33	53	1937/38	105
1933/34	78	1938/39	141
1934/35	86	1939/40	77

The average take for the twenty-five year period 1910-34 is 99 skins; for the ten year period, 1931-40 it is 92. The otter appears to be just about maintaining its numbers.

In spite of Sanctuaries, no increase in the otter catch is evident as yet.

Otters respond well to protection, especially in Tobeatic Park they have increased. In 1931 a total of 47 direct observations of otter were made in the park, where they became very tame. (Prov. Rept.).

Seton (1929, 2, pp. 678,679) speaking of Ontario, which he considers the best otter country in America, says one otter was taken for every forty square miles of the province (1923-24), and enough were left to perpetuate the species, probably four times as many as were taken. This gives a total population of one otter to eight square miles, probably little below primitive conditions. Comparing conditions in Nova Scotia where the average take for the 1931-40 period was 92, and the total

estimated average population 460, the otter population would be one to every forty-five square miles.

While the otter seems to have held its own in recent years, and the sanctuaries insure its continued existence, the population seems low for what the province might support.

Skunk. *Mephitis mephitis* (Schreber).-

The skunk is found throughout the mainland of the province, most commonly in the agricultural districts; fairly common in the Annapolis Valley (Smith, 1940, p. 227); rather rare in interior Annapolis County (Rand, 1933, p. 46) and on the Kedgemakooge area (Sheldon, 1936, p. 211). Neither Anderson nor Clarke mention it for Cape Breton Island.

However, in the Provincial Report for 1937 twelve skins are listed as exported from Cape Breton Island. As a clue to distribution of abundance, in three different years more than half of the skunk catch of the province came from Cumberland County.

The fur returns are:

1930/31	501	1935/36	349
1931/32	563	1936/37	541
1932/33	793	1937/38	317
1933/34	262	1938/39	168
1934/35	471	1939/40	97

The average for these ten years is 406; that for the twenty-five year period 1910-34 is 2,019 pelts.

The take has dropped so much that the status of the skunk requires investigation. It is a hardy animal, usually thriving about civilization, and usually not heavily trapped. There is an indication of a cyclic fluctuation in numbers, but the assumed peaks are far below the earlier average.

Red Fox. *Vulpes fulva* (Desmarest)

It is with hesitation that I attempt to adjust the data on wild-caught animals from the combined wild-taken and ranch-killed data that are presented. There are many more skins of silver fox exported yearly than there are killed on the ranches, for instance. This is what I have done. I have discarded all silver and cross fox data as ranch-raised, even though some few may have been wild-taken, and I have subtracted the yearly ranch-kill of red foxes from the total export of that year.

The red fox is found in all parts of the province; though in recent years it has become scarce in many sections it is still fairly numerous in the central barren lands (Smith, 1940, p. 228). In interior Annapolis County it was fairly common (Rand, 1933, p. 46); in the Kedgemakooge area it was scarce, and there was estimated to be not more than a half dozen in the area; this scarcity being ascribed to the rabbit scarcity (Sheldon, 1936, p. 211). In Cape Breton Highlands National Parks it was found in some numbers in all parts of the area (Anderson, 1941) and Clarke (1942) reported it abundant.

The fur returns are as follows:

1930/31	629	1935/36	1675
1931/32	1528	1936/37	1955
1932/33	1898	1937/38	1174
1933/34	1573	1938/39	1095
1934/35	1822	1939/40	1019

The average for the above ten year period is 1437; that for the twenty-five year period 1910-34 1,555 (probably including some ranch-raised foxes), so the fox would seem to be fairly well maintaining its numbers.

Foxes were reported scarce in the sanctuaries in 1930-31; increasing in 1931-32 and 1932-33 though not rapidly; in 1933-34 more numerous both in and out of the parks than for several years; increasing in Liscomb Park in 1938-39; but still scarce though increasing in 1939-40. There is little of this reported increase shown in the fur return figures. There is no apparent cycle correlated with rabbits in these figures.

Canada Lynx. *Lynx canadensis* Kerr.-

This is the same species that occurs across all northern North America, the only lynx we have. Judging by the annual fur returns in some years Nova Scotia pelts are of a quality equal to any in the Dominion; in other years they bring much lower prices than northwestern furs.

There is a possibility of lynx and wild cat returns being confused, but as lynx have brought $20.00 to $28.00 per skin, while wild cats $2.50 to $6.00 (once $10.63) per skin, I think we may assume that the fur return records are correct.

The laws governing the lynx take are those of most fur bearers, an open season from Nov. 15 to Dec. 31.

The fur returns are as follows: (Table 4).

TABLE 4

Year	30/31	31/32	32/33	33/34	34/35	35/36	36/37	37/38	38/39	39/40
Number of pelts	19	44	16	18	2	8	5	15	30	62
Total value of catch	$ 475	1,232	288	360	40	200	100	300	600	1,240
Av. value per skin	$ 25	28	18	20	20	25	20	20	20	20
Av. value per skin of Canadian catch	$ 25.83	19.83	17.49	16.97	23.23	28.33	34.52	29.91	36.89	35.70

Surveying the province Smith reports that the lynx is still found on Cape Breton Island, but has been decreasing in numbers during the last ten years, and is thought by many to be extirpated on the mainland; even on Cape Breton Island records are becoming fewer each year (Smith, 1940. p.p. 228, 229). In western Nova Scotia it was rare in Annapolis County in 1931, but well known to the inhabitants under the name "Lucifee" (Rand, 1933, p. 46). At Kedgemakooge in the winters of 1932-3 and 1933-4 residents reported tracks, and one being taken some years previous (Sheldon, 1936, p. 211). In the interior of Cape Breton Isand it occurred in small numbers in 1935 (Anderson, 1941) and in 1941 it was abundant there (Clarke, 1942).

The reports of the Department of Lands and Forests, Nova Scotia, occasionally state the lynx is restricted to Cape Breton Island, or that it is practically extinct on the mainland. However, the fur returns by counties, in these reports are as follows (including also 1940-41 and 1941-42 returns) (Table 5).

TABLE 5

	32-33	33-34	34-35	35-36	36-37	37-38	38-39	39-40	40-41	41-42	TOTAL
Annapolis Co.	1	2	0	0	0	0	0	0	0	0	3
Antigonish Co.	6	7	1	4	4	9	8	15	29	28	111
Colchester Co.,	0	2	0	0	1	0	0	0	0	0	3
Cumberland Co.	1	0	0	0	0	0	4	9	4	4	22
Halifax Co.	3	0	1	0	0	0	0	1	0	6	11
Pictou Co.	0	3	0	0	0	0	0	2	0	0	5
Yarmouth Co.	0	0	0	0	0	0	0	0	1	0	1
Total N. S. Mainland	11	14	2	4	5	9	12	27	34	38	
Cape Breton Island	5	4	0	4	0	6	18	35	67	92	231
Total Nova Scotia	16	18	2	8	5	15	30	62	101	130	

This shows that in some years more lynx are taken on the mainland of Nova Scotia than in Cape Breton Island. Only a very few lynx are present in western Nova Scotia. In the eastern part of the mainland they are more plentiful, though less so than on Cape Breton Island.

In Nova Scotia in 1937 it was felt that since most of the lynx came from Cape Breton Island, the establishment of the Cape Breton Island Highlands National Park, reserving some of the best lynx territory from trapping, would result in a reduction of the lynx catch, which in that report was listed as five pelts. However, the reverse proved to be the case.

However, though parks are sound policies for conserving a nucleus of breeding stock from which numbers can spread out into the surrounding country, it is doubtful if the increase in the lynx catch since its establishment can be all attributed to the park. Cyclic fluctuations must be taken into consideration.

The lynx catch for the twenty-five year period 1910-34 averaged thirty-one pelts per year. The lynx population reached a low in 1934-35, (2 skins) and a high (130 skins) in 1941-42. The average of this eight year period representing one upward swing of the cycle is 44.1 skins per year. From this it seems that since 1910, lynx have not decreased in numbers, but may have increased slightly and with the establishment of the park in Cape Breton Island their future is assured in that part of the province.

Now as to cycles, Elton and Nicholson have shown (1942) over Canada generally that

there is a cycle in lynx numbers, and that it covers about a ten year period with a low about 1930-34. Elton used no Nova Scotia data, but the present material is in accordance with his findings. In the 1943-44 season, or the one following, a great decrease in numbers taken in Nova Scotia can be expected.

Elton and Nicholson suggest that the factors which might change the lynx cycle are overtrapping or other human activities, pulling down the whole population to a point at which no cycle could occur. The relatively small number of lynx in Nova Scotia might be advanced as the season for the lynx peak being in 1931-32 and 1941-42, while over the rest of Canada the peak was 1934-36. Otherwise this would give a range of five instead of three different years in which the peak in Canada occurs.

Elton and Nicholson speak of conditions such as overtrapping, where no cycle could occur. They evidently refer to not increasing in numbers. But the Nova Scotia figures present an interesting point. In the Nova Scotia mainland, where lynx are scarcer than in Cape Breton Island at the peak, it appears that the low is less pronounced.

The figures for Antigonish County, the Nova Scotia mainland and Cape Breton Island in the above table illustrate this. It would appear that where lynx were less common the cycle was less pronounced. This accords with Hutchinson's suggestion that cycles may be an expression of populations, rather than controlled by cosmic factors.

As Long demonstrated, the lynx cycle follows the rabbit, and this is true of Nova Scotia. Rabbits were scarce from 1932-33 to 1935-36, and this corresponds with the low in lynx.

To summarize:- Lynx fluctuate violently in numbers in Nova Scotia, probably over a ten year period. High and low years of catches will alternate. In years of plenty, lynx are scarce in western Nova Scotia, common in eastern Nova Scotia, and abundant in Cape Breton Island. In lean years the heavier populations suffer most, and more lynx are taken on the mainland than on Cape Breton Island. Possibly this is due to cycles being an expression of population. As elsewhere, lynx cycles follow those of the rabbit.

With the establishment of a National Park in Cape Breton, the future of the Nova Scotia lynx is assured.

As a management policy, it might be advisable to increase the take in years of abundance, and to restrict it in years of scarcity. This would have to be correlated with wild cat seasons, as both might be taken together. But many, perhaps most cats are taken by dogs and shooting, so that they could be selectively taken. The superior value of the lynx catch for fewer skins ($3,030.00 for 101 skins against $1,659.00 for 553 wild cat skins in 1940-41) would make some management profitable.

Wild Cat. *Lynx gigas* Bangs

The wild cat enjoys no protection and local bounties are apparently paid (Sheldon, 1936, p. 211).

Bobcats are not uncommon throughout the mainland of Nova Scotia (Smith, 1940, p. 229). In interior Annapolis County it was fairly common (Rand, 1933, p. 46) and in the Kedgemakooge area they were plentiful and increasing in 1934 and 1935 (Sheldon, 1936, p. 211).

In 1930-31 wild cats were very plentiful in all sanctuaries, and were viewed with disfavour because they killed deer. In 1931-32 it was pointed out that while the chief food of the cats was rabbit, when the rabbits failed the bobcats would turn to other game. The abundance of bobcats was indicated by the catch of two men of Upper Ohio who took 75 wild cats in the vicinity of Tobeatic Park in 1931-32. The next year wild cats were reported plentiful in all sanctuaries, and snaring carried on in Tobeatic Park where forty-two were snared, and the two Upper Ohio men took sixty in the nearby area. These two catches represented about thirteen percent of the total catch of the province. However they were still reported increasing in Liscomb Sanctuary and it was considered advisable to snare them in that Sanctuary.

In 1935 and again in 1936 the cats are reported less plentiful in the parks, with no mention of control.

Anderson (1941) says there are no claims of wild cats occurring on Cape Breton Island but Clark (1942) reports that some years before Warden Roach stamped six wild cat pelts that had been taken from the Cape Breton Highlands National Park area. Also the provincial fur returns by counties for the period 1932-41 state four wild cats were reported exported from Cape Breton Island.

The fur returns for the period are:-

1930/31	212	1935/36	589
1931/32	188	1936/37	815
1932/33	794	1937/38	452
1933/34	775	1938/39	498
1934/35	705	1939/40	488

The average for the above ten years is 552; that for the twenty-five year period 1910-34 is 514. The wild cat appears to be about holding its own in the province.

The fact that two men of Upper Ohio killed 75 cats in 1931-32, nearly 40% of that season's yield, makes one wonder about the relationship between the figures given above and the status of bobcat that was then increasing in all the sanctuaries to the point where control was considered necessary. Perhaps but a few men take cats with traps or cat dogs. The price brought by the skins $2.50 to $6.00, some $10.63, would seem to make cat catching worth while.

The above figures do not show a cyclic fluctuation corresponding with that of the lynx and rabbit. Rather the highest catches are in years of rabbit and lynx scarcity.

If we consider that 20% of the population is killed each year, the average population would be about 2800 wild cats, with a density of about one cat to every six square miles of forested country.

Muskrat *Ondatra zibethica* (Linnaeus). -

In Nova Scotia in 1930 the open season was in the fall from Nov. 15 to Dec. 31. In 1931 a spring season was opened, from March 1 to April 30. However the next year, 1932 it was thought that the rat population were too vulnerable in the spring especially to shooting, and the season was made to coincide with the general fur season. Shooting muskrats was allawed at first, than prohibited. traps were not permitted within 100 feet of a muskrat house.

The muskrat occurs throughout the province in a variety of habitats (Smith, 1940, p. 235); in Annapolis County, and about Kedgemakooge it is common (Rand, 1933, p. 48 and Sheldon, 1936, p. 213). In the Cape Breton Highlands National Park area it is abundant (Anderson, 1941 and Clarke, 1942).

The fur returns for the period are:

1930/31	46,629	1935/36	33,918
1931/32	28,905	1936/37	48,043
1932/33	13,132	1937/38	51,307
1933/34	17,290	1938/39	56,840
1934/35	38,073	1939/40	48,755

The average catch for the ten-year period 1931-40 is 38,289 pelts; for the twenty-five period 1910-35; 23,491 pelts.

The low catch in the years 1931-34 was blamed on the spring season of 1931 permitting an excessive take. However Elton and Nicholson show that there are fluctuations in muskrat population over all Canada, and that these tend to have a ten year period.

The period of high and low returns for Nova Scotia from 1910-1940 (data from graph in Prov. Rept. for 1940 p. 51) are compared below with Elton's data on highs and lows for Canada.

TABLE 6

high years—**bold face** —— low years—*italic* (figures for Nova Scotia are to the nearest thousands)

Elton year	Nova Scotia year	catch	
1912	**1912**	43,000	skins
	1914	3,000	"
1915	**1915**	12,000	"
1921-22	*1917*	2,000	"
1924-26	**1918**	28,000	"
	1921	22,000	"
	1924	31,000	"
1928	*1927*	17,000	"
1930-33			
1934-36	**1930**	46,000	"
	1932	13,000	"
	1939	57,000	"

It is interesting to note that compared with the records back to 1910, the 1932 catch was one of the four smallest catches on record; the catch of 1930 and the seasons from 1936 to 1940 the largest on record; the average yearly catch for the period 1931-40 is considerably above the twenty-five year average.

We may conclude that despite heavy trapping, the muskrat is yielding a better harvest than in the past.

There will always be lean years and fat years, and the management seems to be to take a good harvest in the fat years and restrict the take in the lean years.

Squirrel. *Sciurus hudsonicus* Erxleben

The squirrel enjoyed no protection, though by 1937 the possibility of a closed season was mentioned (Prov. Rept).

The red squirrel is common and generally

distributed throughout the forested areas of the province (Smith, 1940, p. 230). In interior Annapolis County the squirrel was one of the most common mammals of the region (Rand, 1933, p. 47); in the Kedgemakooge area common (Sheldon, 1936, p. 212). In the National Park area in Cape Breton Island it was abundant (Anderson, 1941; Clarke, 1942).

The fur statistics follow:

1930/31	203	1935/36	10,115
1931/32	237	1936/37	25,949
1932/33	107	1937/38	12,447
1933/34	548	1938/39	46,369
1934/35	420	1939/40	9,361

When Anderson reviewed the fur situation ten years ago (Anderson, 1934) the squirrel was considered too small for profitable exploitation. In 1930-32 the price for skins was only 1 and 2 cents. However from 1933 the price has been between 6 and 12 cents a skin.

Squirrels will probably continue to give a high yield, but fluctuations in numbers must be expected, as great as those in muskrats, but with a shorter period.

LITERATURE CITED

Anderson, R. M., 1934, The Distribution, Abundance and Economic Importance of the Game and Fur-bearing mammals of Western North America, *Proc. Fifth Pacific Science Congress*, pp. 4055-4075.

....., 1941, Mammals of Cape Breton Highlands National Park, Nova Scotia, Mss. filed in Division of Biology, Nat. Mus. of Canada. (Based on Museum expeditions in 1924 and 1935).

Canada Year Book for 1931-1940.

Clarke, C. H. D., 1942, Investigation of Cape Breton Highlands National Park. Mimeographed by National Parks Bureau, released for limited use. (Based on field work in 1941).

Elton, C. and Mary Nicholson, 1942-A, Fluctuations in numbers of the Muskrat (*Ondatra zibethica*) in Canada. *Journ. Anim. Ecology*, 11, pp. 96-126.

....., 1942-B, The Ten-year Cycle in Numbers of the Lynx in Canada, *Journ. Anim. Ecology*, 11, pp. 215-244.

Fur Production of Canada, Season of 1930-31 to 1939-40.

Hewitt, C. G., 1921. The Conservation of the Wild Life of Canada, New York.

Province of Nova Scotia, Report of Dept. of Lands and Forests, 1931-40.

Rand, A. L., 1933, Notes on the Mammals of the Interior of Western Nova Scotia, *Can. Field-Nat.*, XLVI, pp. 41-50.

Report on the fur farms of Canada, 1931-40.

Seton, E. T., 1929, Lives of Game Animals, Vol. 1-4, New York.

Sheldon, C., 1936, The Mammals of Lake Kedgemakooge and Vicinity, Nova Scotia. *Journ. Mammal.*, 17, pp. 207-215.

Smith, R. W., 1940. The Land Mammals of Nova Scotia. *Amer. Midl. Nat.*, 24, p.p. 213-241.

Soper, J. D., 1919, Notes on Canadian Weasels, *Can. Field-Nat.*, XXXIII, pp. 43-47

CURRENT LITERATURE

A LIST OF THE BIRDS OF NIPAWIN, SASKATCHEWAN, *by Maurice G. Street, 1943, Contribution No. 2, Yorkton Nat. Hist. Soc., Yorkton, Sask., pp. 8. Price .10¢ (mimeographed).*

A map of the area, and a good summary of the general features of the country covered, is followed by a briefly annotated list of 196 species of which 115 are recorded as nesting; migration and nesting dates are given. Observations have been made since 1922.

Northern Saskatchewan has been almost completely neglected by bird students. The present list which appears to represent the most northeastern locality in Saskatchewan that has been well worked is especially welcome. Some of the more interesting records are; Burrowing Owl nesting; Chimney Swift nesting; American Three-toed Woodpecker nesting; Lewis's Woodpecker; Cooper's Hawk, Old-squaw Duck; and European Starling.

— A. L. RAND.

NOTES ON THE STATUS AND DISTRIBUTION OF CERTAIN MAMMALS AND BIRDS IN THE MACKENZIE RIVER AND WESTERN ARCTIC AREA IN 1942 AND 1943.[1, 2]

By C. H. D. CLARKE
Ottawa

THE INFORMATION contained herein is the product of more than three months, from July 10 to October 20, 1942 spent in the Mackenzie district in field work relating to reindeer. My itinerary extended from Aklavik to Burnside River and back, travel being by schooner, July 21st-September 17th. The trip to Aklavik was made by aeroplane, with numerous stops. The return trip in October was by boat to Good Hope and by aeroplane the rest of the way, with stops at Good Hope and Simpson. In addition to personal observations I was able to obtain information from a number of people whose experience covered a large portion of th Mackenzie District. During the ensuing year comments and reports on wild life were obtained from members of the Royal Canadian Mounted Police and other persons.

Some new distributional records were obtained. In addition, the information obtained on certain species of special interest gives an idea of their status,which may be of some general interest. Faunal information for the region was summarized by Preble (1908) and important contributions have since been made, particularly by Anderson (1913, 1937), Williams (1933) and Porsild (1943). I am placing on record here only such observations as add to the information already available in print.

Changes in animal populations in the Northwest Territories, whatever their nature, are of economic importance. In spite of the immense area and occasional large concentrations of mammals and birds, plant growth, from which ultimately all animals must derive their sustenance, is slow. To offset local concentrations there are large unproductive spaces and it has been realized for some time that wild life resources are no more than sufficient for those who must depend on them for a living, especially Indians and Eskimos. In recent years the development of mineral resources has brought many persons to the Mackenzie District. To newcomers the exploitation of wild life resources as a means of livelihood is denied by the Game Regulations. A number of white trappers moved into the Northwest Territories in the twenty years prior to 1934, especially after the first world war, but trapping by non-natives is now restricted to those who qualified as residents and held licenses on May 3, 1938, and to the children of residents.

Since 1936 there has been an increase in the number of forest fires. Increased human activity and a period of comparative drought have contributed to this condition. New developments in forest protection are greatly hampered in war time by the difficulty of obtaining suitable men. Such developments are, however, a feature of all post-war rehabilitation projects. Meanwhile the effect of forest fires must be taken into consideration.

The most important phenomena in the natural history of many fur-bearing animals and some other species in the Mackenzie District are periodic cycles in numbers. Since 1935-36 the Bureau of Animal Population, Oxford University, and the Northwest Territories Administration, with numerous co-operators, have investigated fluctuations in Arctic foxes, lemmings, and snowy owls. Results of these investigations are published annually in the Journal of Animal Ecology.

The species on which notes of some interest were made are the following:-

1. —Published with the permission of the Director, Lands Parks and Forests Branch, Department of Mines and Resources, Ottawa.
2. —Received for publication January 29, 1944.

MAMMALS

Black Bear - *Ursus americanus*.- Black bears in this district are generally and sparsely distributed in timbered areas, but their numbers evidently fluctuate somewhat. In 1942-43 they were unusually abundant at several places, especially Norman and Providence. In the Mackenzie Delta and the Kugalluk and Anderson River areas the next species dealt with is the one ordinarily expected but black bears may be found occasionally wherever there are woods.

Barren Ground Bears - *Ursus richardsoni* and related forms.- These bears are found locally in the Mackenzie Delta, Richardson Mountains, Reindeer Reserve and eastward on the mainland in barrens and semi-barrens to beyond Bathurst Inlet. In many parts of this range their numbers are possibly as great as they ever were. However, this cannot be said of the Delta and its fringes, where conditions peculiarly suitable for them are found and where they were once more numerous than elsewhere. The innumerable cut-banks of the Delta offer ideal hibernacula for bears and the hills to the east and west are excellent summer range for them. The Eskimo name "Aklavik" applies to the whole lower Delta and means "bear country".

For many years now the annual muskrat hunt has scattered people all over the Mackenzie Delta in spring when the barren ground bears are still there. In addition the reindeer development, which takes people to Richards Island in summer, and the use of Tuktoyaktuk as a freight depot have both affected the bears. A few years ago as many as fifteen "barren ground bears" were killed in a year on Richards Island. A closed season, recently established on this species in June, July and August will give them some measure of protection and at the same time leave ample scope for hunting them during the months when they are really needed as food.

I saw no bears during my stay but saw old signs at Tuktoyaktuk and Paulatuk and fresh tracks at Igdluk (east of Tuktoyaktuk).

Marten - *Martes americana*.- In all parts of the Mackenzie District marten were reported decreasing. In most places they are now rare, and only in a limited region around the headwaters of Anderson River was any number reported. The Mackenzie District was once the best marten country in Canada. In the period 1851-56 the average annual marten catch was over 30,000 (Anderson 1857) and the up-river section sometimes had catches comparable to the present take for the whole Dominion. Such catches were made without depleting the stock of marten. Although there were yearly fluctuations, these were not influenced by the catch. In all wild life harvests it is becoming evident that there is a limit under which the harvest does not affect the stock, but once this threshold is crossed the species concerned starts to go down. When the population is restored, near-threshold harvests may again be taken with impunity.

In recent years there has been no marten cycle in the Mackenzie District. The harvest-limit threshold seems to have been crossed during and just after the first Great War, for which period no adequate catch records are available. From 1920-21 to 1929-30 the annual catch stayed around 10,000. Then it declined by half. In 1938-39 and 1939-40 a further decline took place to well under 5,000. The marten catch was limited by Order-in-Council in 1940, but a study of the operation of this limitation showed its ineffectiveness. In 1943 the marten season was closed. As there is yet no section where they are extinct one may expect with some confidence that the complete protection now accorded the marten will be effective.

Forest fires are often blamed for the marten shortage. However, the shortage certainly antedates any unusual prevalence of fires, and marten do not require mature timber. They are abundant in young stands in such places as Jasper National Park.

In the winter of 1942-43 a number of marten (reported to me as 34) straggled out miles beyond the edge of timber to the coastal area near Tuktoyaktuk. One was taken out on the sea ice. Occurrences of this sort often indicate some disturbance of the population within the normal range.

Fisher - *Martes pennanti*.- For a number of years no fisher have been reported in the Mackenzie District except in the Fort Liard area. At this post a very few skins from the Mackenzie District are traded annually.

Mink - *Mustela vison*.- The mink is an old standby of the fur trade in the Mackenzie District. In 1942-43 it was abundant south of Great Slave Lake, much less so on the Upper

Mackenzie, and generally scarce on the lower Mackenzie. These variations are considered part of the normal population cycle.

Wolverine - *Gulo luscus*.- Along the Mackenzie wolverines are scarce. Even in the barren lands they are not common. However, they could hardly be called extinct anywhere, and in the mountains west of Aklavik they may even be common. Wolverine skins are in great demand by Eskimos to trim winter clothing and most of the skins used for this purpose at Aklavik and Tuktoyaktuk are imported, chiefly from British Columbia. The wolverine is important enough in Eskimo economy to justify the conservation of the limited supply remaining in Canada.

Coloured Fox - *Vulpes fulva*.- This fluctuating species was obviously at or near a peak in numbers throughout the district, and was observed frequently.

Arctic Fox - *Alopex lagopus*.- The white fox has been declining in importance along the south coast of Beaufort Sea and Amundsen Gulf. At the same time coloured foxes are increasing. West of Dolphin and Union Strait coloured foxes are in a majority on the tundra. However, there is often a run of white foxes off the sea ice. In Bathurst Inlet and the barren lands to the south 1942 and 1943 were years of phenomenal white fox abundance.

Wolf - *Canis lupus*.- The distribution of wolves seems to accord with the distribution of caribou. Where caribou are abundant wolves are numerous. Where caribou are rare or absent wolves are rare. In the barrens and adjacent wooded areas wolves are plentiful. Along the Mackenzie they are generally scarce, except at Providence where, for causes unknown, they are reported to be abundant. Along the coast they are scarce near the Mackenzie but more common from Paulatuk eastward. Sufficient experience has been accumulated to show that domestic reindeer are vulnerable to wolves only to the degree in which they are left unherded. At one Eskimo-owned reindeer herd wolves which had "prowled" the herd for days on end finally left without making a kill. Unherded reindeer are very vulnerable to wolves in comparison with caribou.

Lynx - *Lynx canadensis*.- There was apparently some recovery of lynx numbers but this valuable species does not maintain its population under intensive trapping.

Hooded Seal - *Cystophora cristata*.- In the 1941-42 season a hooded seal was killed near Tuktoyaktuk. The description was unmistakable. It has not been reported previously from western Arctic waters. Ringed and bearded seals (*Phoca hispida* and *Erignathus barbatus*) are abundant and continue to be a vital resource.

Walrus - *Odobenus divergens*.- MacFarlane (1905) reported walrus numerous in western Arctic waters eighty years ago. I was shown several old hauling-out places by Eskimos. Apparently the herds were killed out during the early days of commercial whaling, but stragglers continue to put in an appearance, and have been killed in recent years at Herschel and Baillie Islands and Banks Land. It may be that the range of Atlantic and Pacific walrus is continuous through Lancaster Sound, Barrow Strait and Melville Sound.

Beaver - *Castor canadensis*.- Beaver cuttings from Anderson River were seen by me in driftwood at Nicholson Island, where a few beaver are taken annually. In the Mackenzie Delta, which has been a beaver preserve since 1940, their increase has been most gratifying. For the rest of the country, beaver are very abundant in some parts of the lower Macknzie District, although less numerous around settlements. In the upper portion of the district they were decreasing and on July 22, 1943, the quota per hunter south of Great Slave Lake and the Liard River was reduced from fifteen to ten animals. Forest fires have contributed to the beaver shortage although they may not be harmful to beaver in the long run.

Muskrat - *Ondatra zibethicus*.- I learned with some surprise of the population of muskrats to be found beyond the limit of trees in tundra ponds, whether fresh or brackish, throughout the unglaciated coastal region as described by Porsild (1938) which extends east to beyond Horton River. They have certainly increased in recent years. Around Tuktoyaktuk and Anderson River an excellent harvest is reaped and the skins are large and of good quality.

The muskrat catch of the Mackenzie Delta is one of the richest fur harvests in Canada. It is roughly 70 per cent of the total Northwest Territories muskrat yield, which means that it fluctuates around 200,000 skins per annum. There is no sign that the rat population has changed much in recent years, although

the catch was lower than usual in 1943.

There have been low years in the past, in 1925 and 1935. The catch during the years preceding these two low years was not as high as it has been lately. It may be that these low years are corresponding phases of a ten year cycle, and that another low may be expected in 1945. The evidence on muskrat cycles in this region is not clear and its clarification will require years of accurate records. A great many people in the Delta believe that there is a cycle, and the possibility must be admitted. It is likewise believed by some that a decline should have set in by this time, but this has been prevented by the large annual catch. Thus the muskrat population is envisaged as being in a delicate balance, with an increase or decrease in the catch equally undesirable. There is no definite scientific basis for this belief.

Along Slave River muskrats are reported to be increasing. On the Mackenzie River above the Delta they have been scarce for several years. At Simpson a dramatic reduction from abundance in 1939 to scarcity in 1940 is reported. In the intervening fall they were observed wandering overland.

Porcupine - *Erethizon dorsatum*.- I was informed by Mr. Bob Cockney (Eskimo) that he once killed a porcupine on the Arctic Coast at Shingle Point, Y.T.

Arctic Hare - *Lepus arcticus*.- There seem to be very few arctic hares on the unglaciated area already mentioned. I saw signs only from Cape Parry eastward, and no hares.

Mule Deer - *Odocoileus hemionus*.- When I was at Simpson, in October 1942, mule deer were reported near town on an island at the mouth of the Liard River.

Moose - *Alces americana*.- Signs of moose were seen by me on the east side of the Mackenzie Delta. Two were seen from the boat at Thunder River in October. In the same month an Indian brought fresh moose meat into Good Hope, and a few days later I was informed at Simpson that a moose had been seen on the road to the airport.

Reports of moose show that they are increasing east of Aklavik and around Good Hope. The upper Mackenzie posts report a decrease in moose. The cause of this remains to be seen, but it may be a temporary result of severe forest fires, in which case a recovery may be expected, as forest fires produce abundant moose browse. The Mackenzie Delta is excellent moose country and was once well populated, but they were long since killed off and those invading now do not survive long. The supply of moose hides in the Mackenzie district is far below the demand.

Woodland Caribou - *Rangifer caribou*.- Woodland caribou are found in scattered groups east of the Mackenzie River and south of the Liard River and Great Slave Lake. West of the Mackenzie there are also caribou, but their specific relations are not known. Migratory barren ground caribou from Yukon Territory are reported to come within 100 miles of Norman, but it is more likely that sedentary herds in the Mackenzie Mountains are Osborn's caribou. This is speculation, but it does seem unlikely that they are woodland caribou.

Woodland caribou have never been abundant, but until recently there was reason to think that they were holding their own. East of Good Hope there were a few in the Anderson River drainage, and some towards Norman. A few have been reported east of Norman. In the Providence area they were more abundant, especially in the Horn Mountains and the Willow Lake country. There were herds south and west of Great Slave Lake and the Upper Mackenzie. In Wood Buffalo Park their numbers were insignificant and individuals reported east of Slave River may be regarded as stragglers. In 1942 and 1943 much of the best woodland caribou ground was burned over, and a winter road built that year from the lower Hay River to Mills Lake and Norman Wells passes through the heart of their range. It is likely that these events have brought about a reduction in the already slender stock of woodland caribou.

These animals have been on the decline for years. Where other species are affected little by forest fires, or even in some cases, benefited, caribou winter range is completely destroyed and the population proportionally reduced. Woodland caribou were always locally distributed in accordance with the distribution of patches of winter range, and where once there were hundreds there are now fives and tens. No other species stands in such immediate danger of extinction in the Mackenzie District.

Barren Ground Caribou - *Rangifer arcticus*.- During the summer of 1942 I saw fresh tracks of barren ground caribou at Paulatuk, a con-

siderable migration at Coppermine and numbers scattered along the shores of Bathurst Inlet. In addition considerable information was obtained from various observers concerning them.

The Alaska-Yukon caribou, or rather a portion of them, customarily migrate along the coast south of Herschel Island in the summer. In the autumn they turn south. A fair concentration is usually found not far from Aklavik in autumn. In the autumn of 1942 they did not appear and local hunters got none. This group of caribou seems to maintain good numbers. East of Aklavik caribou do not appear until the Eskimo Lakes are passed. At one time they were abundant on the Reindeer Reserve but they were exterminated during the years when the whalers wintered at Herschel Island. On the lower Anderson River they are scarce, but higher up they are more common. South of Langton Bay, Paulatuk and Pierce Point they are reasonably common, considering the quality of range. Inland, their numbers must have increased greatly on the barren north of Great Bear Lake. A large migration came into the Good Hope area during the winter of 1941-2 and that post had more caribou than it had known for two generations. In the spring of 1940, to cite another record, 5 barren ground caribou were seen on the river ice in front of Simpson, the first record of this sort for thirty years or more.

In the Coppermine area, summer migrations west of the river saw a few animals reach the coast at Bernard Harbour, a barren area which cannot support many caribou, but which once was on the path of a migration to Victoria Island. Numbers south of the coast continue small, however, until the Dease River region is reached. The region south of Coronation Gulf supports large herds which regularly reach the coast in summer. In late August and early September 1942 a big migration passed close to Coppermine settlement and it was my privilege to discover the animals and give the news to the natives. The Bathurst Inlet country likewise has large herds of caribou.

East of Fort Smith on the Taltson River drainage the number of caribou has decreased, due to severe forest fires, which affect barren ground caribou wintering grounds precisely as they do those of the woodland species. Fortunately a number of groups of barren ground caribou winter beyond the tree line. Probably in part or wholly because of fires the caribou have not extended their migrations westward in the Resolution and Fort Smith areas as far as usual.

Musk-ox - *Ovibos moshatus*.- In 1940 I published (Clarke 1940) a summary of the status of the musk-ox on the Canadian mainland, and while I saw none in 1942 I was able to obtain some interesting records which, supplemented by other reports available, enable me to bring the information on musk-oxen up to date. There is no doubt that this species has continued to increase.

A recent Royal Canadian Mounted Police report indicates the presence of a herd near the north end of Dubawnt Lake. Mr. W. Carson, Hudson's Bay Company manager at Good Hope, who had recently come from Stony Rapids, Saskatchewan, informed me that George Oman, one of the Dubawnt River trappers, had seen two musk-oxen at the south-east bay of Dubawnt Lake. A more recent police report indicates the presence of a good sized herd on the north-east shore of Clinton-Colden Lake. At Bathurst Inlet a few are reported along the shores of the inlet and near Burnside. The M.S. "Margaret A" saw one in the inlet in 1942 and previously they had been seen from the mission supply ship "Our lady of Lourdes". A scattering of musk-oxen over the Bathurst Inlet region is indicated with two definite centres of abundance, namely near Beechy Lake and on the Hood and Cracroft Rivers. Musk-oxen are also reported near Sherman Inlet.

Further west, I learned from Mr. Wm. Storr of Stapylton Bay, that the Reid Island natives, who have been hunting on the mainland, have seen musk-oxen and signs of musk-oxen inland all the way from Stapylton Bay to Deas Thompson Point. They have seen no large herds. Occasionally a few animals have reached the coast. Reverend Father A. Biname told me that natives from Paulatuk had recently encountered a musk-ox to the southward, on Horton River. Finally, as a possible explanation as to where these animals all came from, Reverend Father Robin at Good Hope informed me that the Gens du Large (Barren Land or Arctic Hare branch of the Hare Indians) traded musk-ox skins there during the last years (up to 1916) when this was legal. There has evidently been a larger remnant north of Great Bear Lake than was recorded, and it has increased.

Attention should also be called to the information on musk-oxen west of Hudson Bay, published by Manning (1943). Recent information on Bothia Peninsula is lacking.

Bowhead Whale - *Balaena mysticetus*.- This species is increasing in Beaufort Sea and and schools are occasionally reported.

White Whale - *Delphinapterus leucas*.- White whales are still common in the estuarial waters just outside the Mackenzie Delta, and are an important staple for the local natives. The 1942 whaling season was satisfactory.

BIRDS

These notes supplement records published by Porsild (1943) and refer to areas visited by me but not included in his compilation. Names follow Taverner's "*Birds of Canada*" (Ottawa, 1934).

Common Loon - *Gavia immer*.- Observed at Cape Parry, August 18, 1942, and Darnley Bay, August 20, 1942.

Yellow-billed Loon - *Gavia adamsi*.- I saw this species only in Bathurst Inlet and around the entrance of the Inlet. There it was common.

White Pelican - *Pelecanus erythrorhynchos*.- Mr. Jim Harris reported one at Good Hope in the spring of 1937 or 1938. Pelicans are still to be seen around Fort Smith, coming from a nearby colony on an island in Slave River. As pelican colonies go this one is small, but it is well located and maintains its numbers. It is in Alberta, and not in the Mackenzie District as commonly stated.

Trumpeter Swan - *Cygnus buccinator*.- Mr. Jos. Hall of Good Hope, formerly of Fort Franklin, reported a small colony of swans at Willow Lake, between Norman and Good Hope. These birds are far from the breeding ground of the whistling swan and should be trumpeter swans. On July 17, 1942, I saw a pair of swans from the air on a muskeg lake west of Arctic Red River. This is also well south of the whistling swan breeding ground.

Barnacle Goose - *Branta leucopsis*.- The Eskimo Billy Thrasher told me that he once shot at Paulatuk what he described as a "cross between a wavy and a honker". The detailed description he gave was that of a barnacle goose. In addition he reported snow geese and brant, and two varieties af Canada goose, distinguished by size and redness of legs.

Surf Scoter - *Melanitta perspicillata*.- Observed at Cape Parry on Aug. 18, 1942.

Rough-legged Hawk - *Buteo lagopus*.- Observed at Paulatuk, Coppermine and other Coronation Gulf points, and Bathurst Inlet. Quite a number were migrating from the direction of Victoria Island.

Peregrine Falcon - *Falco peregrinus*.- Common in Coronation Gulf and Bathurst Inlet, where cliffs abound. Young of the year were seen.

Ruffed Grouse - *Bonasa umbellus*.- This species is not found at Good Hope, therefore its northern limit is farther south.

Sharp-tailed Grouse - *Pedioecetes phasianellus*.- Reported common in 1942 at Good Hope, Norman Wells and Simpson. I saw one at Simpson on October 20.

Sandhill Crane - *Grus canadensis*.- One was heard at Paulatuk on August 19, 1942, and a flock was seen at Coppermine on August 24th. These are the northern sub-species, still common on the tundra. Nesting cranes are rare farther south. However, an interesting colony is established at Simpson under the watchful eye of Cpl. W. J. G. Stewart of the R.C.M. Police. In 1938 there were 2, in 1940 and 1942 there were 23, and in 1943 there were 17. These figures presumably representing feeding flocks and for the more recent years may include young birds.

Golden Plover - *Pluvialis dominica*.- Seen at Paulatuk, August 19, 1942.

Hudsonian Curlew - *Phaeopus hudsonicus* - One seen at Paulatuk, Aug. 19, 1942.

Herring Gull - *Larus argentatus* - Observed along the coast by me only from Cape Parry eastward.

Arctic Tern - *Sterna paradisaea* - The fact that this species was not observed in Bathurst Inlet, August 25-30, 1942, may be of interest. Elsewhere on the coast it was common.

Thick-billed Murre - *Uria lomvia* - Several were seen near Cape Parry on August 18, 1942. The Eskimo Lennie informed me that this was one of the component species of the large bird colony on Nelson Head, Banks Land, an eminence which can be seen from Cape Parry on clear days. This species has not been recorded previously from Canadian waters in the western Arctic.

American Robin - *Turdus migratorius* - Robins, including a bird of the year, were found at Burnside on August 26, 1942. This extends their recorded range in this longitude beyond a barren inland area where none are found. They were in a thicket of large willows and alders.

Arctic Redpoll - *Acanthis hornemanni* - Seen at Paulatuk, Coppermine and Burnside.

Redpolled Linnet - *Acanthis linaria* - Abundant on the Arctic coast; identified at Paulatuk, Coppermine and Burnside.

Savannah Sparrow - *Passerculus sandwichensis* - Generally distributed; very common at Coppermine on two days, namely August 24 and September 3, 1942, obviously migrating.

Tree Sparrow - *Spizella arborea* - Observed along the coast and also at Burnside, Bathurst Inlet, August 26, 1942.

Harris' Sparrow - *Zonotrichia querula* - Common at Burnside on August 26, 1942, both adults and young of the year being seen.

White-crowned Sparrow - *Zonotrichia leucophrys* - Common at Burnside on August 26, 1942, including young of the year.

Snow Bunting - *Plectrophenax nivalis* - Migrating flocks were observed on the Mackenzie River from Arctic Red River to Good Hope, October 9-12, 1942.

REFERENCES

ANDERSON, JAMES - 1857 - Report on McKenzie's River District. M.S.S.

ANDERSON, R. M. - 1913 - Report on natural history collections of the expedition (1908-1912), in *"My Life with the Eskimo"* by V. Stefanssson; New York, pp. 436-527.

..... - 1937 - Mammals and birds, in *"Canada's Western Northland"* by W. C. Bethune; Ottawa, Dept. of Mines and Resources, pp. 97-122.

CLARKE C. H. D. - 1940 - A biological investigation of the Thelon Game Sanctuary, *Nat. Mus. Can., Bull.* 96.

MACFARLANE R. - 1905 - Notes on Mammals collected and observed in the Northern Mackenzie River District, Northwest Territories of Canada. *Proc. U.S. Nat. Mus.* 28: 673-764.

MANNING, T. H. - 1943 - Notes on the coastal district of the eastern barren grounds and Melville Peninsula from Igloolik to Cape Fullerton, *Can. Geog. Journ.* 26: 84-105.

PORSILD, A. E. - 1938 - Earth mounds in unglaciated Arctic Northwestern America. *Geog. Rev.* 28: 46-58.

..... - 1943 - Birds of the Mackenzie Delta. *Can. Field-Nat.* 57:19-35.

PREBLE, A. E. - 1908 - A biological investigation of the Athbaska - Mackenzie region. *U.S. Bur. of Biol. Surv., N.A. Fauna No.* 27.

WILLIAMS, M. Y. - 1933 - Biological notes, covering parts of the Peace, Liard, Mackenzie and Great Bear River basins. *Can. Field-Nat.* 47: 23-31.

CURRENT LITERATURE

WHITE SPOTTING IN THE FOX, *by Leon J. Cole and R. M. Shackelford, 1943, Amer. Naturalist,* 77, *pp. 289-321.*

This deals with the origin and genetics of the platinum fox, a pale mutant of the silver fox that is always accompanied by white spotting. Similar strains originated independently in Norway in 1933, Wisconsin in 1937, Wyoming in 1937 and Quebec in 1938. In 1940 one skin from Norway brought $11,000.00 in New York. Platinum behaves in inheritance as a dominant which is lethal when homozygous. Some white-faced silver fox mutants are similar to the platinum and are discussed. — A. L. RAND.

NOTES AND OBSERVATIONS

NOTES ON THE LARGE SHORT-TAILED SHREW AT FORT GARRY, MANITOBA. — During November, 1943, information of an apparently unusual nature was obtained regarding *Blarina brevicauda* (Say) in the rural municipality of Fort Garry. Early in the month a well worn runway of this shrew was discovered under the leafy litter of a dry, wooded lot only 12 feet from the side of my house; to be exact, the location is one-half mile from Red River and a mile south of the limits of Winnipeg. I was first attracted to the spot by the extremely thin, shrill cries of the species as though two of the animals had met in angry protest.

It was not until later that investigations could be undertaken. On November 13 a single trap was set at a strategic point in the subsurface runway already mentioned. Between that date and the 25th of the month 13 examples were taken in one trap at the same location. As the set was kept in working order for another week without further captures, it was concluded that all members of this local colony had been collected. No former results in personally trapping for these animals anywhere nearly compares with the abundance exhibited at a single set as in the present instance. As I have failed to find anything in the literature of comparable character, it was decided to place the data on record.

Numbers of the animals present in this habitat may have represented a somewhat unusual concentration, owing to the isolated nature of the area concerned. The wooded part of this single town lot, which sheltered the shrews, amounts to about 480 square yards. East and west it is bounded by occupied lots with buildings and open lawns; to the south by a gravel road; and to the north by grassland and a well travelled lane 8 feet wide. Beyond the latter is a large block of old Transition Zone woodlands. Aside from the small area of trees and shrubs inhabited by the shrews, the immediate environment is wholly unsuited to the requirements of *Blarina*.

Two of the shrews taken were too badly eaten to be preserved. Details concerning the other 11 specimens are as follows: Average measurements of 5 males, L. 127, T. 27, H.F. 16.3 mm. (extremes, 125, 27, 15.5 and 130, 28, 16.9 mm.); average weight, 21.6 grams (extremes, 18.3 and 25.6 gms.). Average measurements of 6 females, 124.3, 26.1, 15.8 mm. (extremes, 119, 25, 15.5 and 128, 26, 15.9 mm.); everage weight, 19.8 grams (extremes, 18.2 and 20.9 grams). — J. DEWEY SOPER, WINNIPEG, MANITOBA.

EXTENSION OF RANGE OF PUGET SOUND SPOTTED SKUNK (*Spilogale phenax olympica*). — Although reports have been received that the Puget Sound spotted skunk (*Spilogale phenax olympica* Elliott) had been seen and taken as far north as Maguire on the Pacific Great Eastern Railway, it was not until the Fall of 1943 that a definite record was secured, when four of these animals were killed at Alta Lake, British Columbia.

They had appeared about the cabins of some of the residents, and in one instance had gained entrance to the larder. On December 17th, 1943, an adult male was secured as a specimen, which extends the range of *olympica* into the mountains seventy miles north of Vancouver, B.C. — KENNETH RACEY, VANCOUVER, B.C.

EXTENSION OF RANGE OF THE NORTHERN SPOTTED OWL (*Strix occidentalis caurina*). — For some years past, the call of an unidentified owl has been heard during the summer months, in the general vicinity of Alta Lake, British Columbia, and it was not until the 12th of December, 1943, that a bird was secured and definitely identified, when an adult female spotted owl was caught in a trap set for weasel, near Cheakamus River. Fortunately the trapper saved the specimen intact, and forwarded it to the writer, in whose collection it is now Number 2939.

On dissection, the stomach was found to contain the remains of a Grey Jay, *Perisoreus obscurus griseus*. The ovarian mass measured 8 x 18 mm., and three ova 2 mm., which would indicate that this owl would have nested during the month of February. — KENNETH RACEY, VANCOUVER, B.C.

BOOK REVIEWS

NATURAL HISTORY SOCIETY OF MANITOBA. 21ST ANNIVERSARY BULLETIN. 1920 TO 1941. *Published by an Editorial Committee under the Chairmanship of Dr. A. M. Davidson.*

This amply illustrated and well printed bulletin recounts the very considerable achievements of the Manitoba Natural History Society on the occasion of its 21st anniversary. The history of the Society is outlined, lists of its officers presented, as well as brief obituaries of deceased members. There are detailed accounts of the work of Sections dealing with Ornithology, Botany, Entomology, Geology, Mammalogy, Ichthyology, and Microscopy and brief notices of the activities of members interested in Conchology and Ethnology.

One important early activity of the Society was the erection of a clubhouse and collecting station at Victoria Beach in 1923. This clubhouse served as a centre for the Society's botanical survey of Victoria Beach and its ornithological survey of Elk Island. The results of these surveys are presented in some detail. Other important contributions of the Society have been the initiation of mosquito control work in the Winnipeg area and a leading part in the establishment of the Manitoba Museum which was opened in 1932.

Among the important publications of the Society have been: A Colour Key to Manitoba Butterflies, Check List of the Manitoba Flora, and Geological Formations of Manitoba.

The Manitoba Natural History Society has long been affiliated with the Ottawa Field-Naturalists' Club; its members use The Canadian Field-Naturalist as a medium of publication. The Canadian Field-Naturalist extends its warmest congratulations to the Manitoba Society both in token of its achievments throughout twenty-one years of service and on the publication of a fine anniversary bulletin. — HAROLD A. SENN, EDITOR.

THE BIOTIC PROVINCES OF NORTH AMERICA. *by Lee R. Dice. University of Michigan Press, Ann Arbor. 1943. pp. 78 + 1 folded map. Price $1.50.*

For many years students have been attempting to replace Merriam's Life Zone concept. Dice offers a new set of concepts and divisions as an experiment. These biotic provinces are based chiefly on the vegetation, but also on peculiarities of the fauna, climate, physiography and soil.

The reviewer thinks that biotic provinces should be the next divisions below a region, and should take into account the age and evolution of the biota. Perhaps satisfactory divisions for all plants and animals cannot be worked out, but to be practical for any one group, the areas should delimit the natural ranges of a considerable number of species.

The provinces are sketchily outlined and characterized. A bewildering array is set forth for the southern United States. In Canada the union of Merriam's Hudsonian and Canadian Life Zones can be defended; but the inclusion of the lower Ottawa Valley, Gaspe, and Cape Breton Island, in the same province seems indefensible, as does the uniting of the southern half of British Columbia, excepting the coastal area, into another province that includes such diversities as the desert-like valley bottoms, the wooded slopes, and the arctic-like alpine grasslands.

The contention that biotic provinces must be continuous except for marine islands, minimizes the fact that mountain tops may be biotic islands.

The terminology, as Hudsonian Province for Merriam's Canadian and Hudsonian zones, and Canadian Province for the eastern part of Merriam's Transition Zone would cause confusion.

Dice deplores the lack of detailed ecological studies, but does not use many of the more important available studies, such as: Halliday on the forests of Canada; Fernald on Eastern Canada; Nichols for Cape Breton Island; Raup for Wood Buffalo Park and the Peace and Liard River Valleys; Porsild on Alaska and Hulten on the Arctic Biota.

It seems that for birds and mammals this will not be a more useful scheme than that of Merriam. — A. L. RAND.

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Central Experimental Farm
Ottawa, Ont.

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Woodside Cottage
Wheeler's Lane
Smallfield, Surrey, England

Robertson, C. N. (1932)
Apt. 601, The Claridge
1 Clarendon Ave.,
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67 Alcina Avenue
Toronto, Ont..

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Department of Mines,
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MEMBERS AND SUBSCRIBERS

—A—

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Experimental Farm,
Ottawa, Ont.

Agriculture, Department of
Dominion Entomologist,
Confederation Building,
Ottawa, Ont.

Agriculture, Department of
Library, Confederation Block
Ottawa, Ont..

Agriculture, Department of
Library,
Washington, D. C. U.S.A.

Ahern, G. S.
20 St. Antoine Street,
Quebec, P. Q.

Alcock, F. J.,
Geological Survey,
Ottawa, Ont.

Alexander, D. C.
127 Durant St.,
Lowell, Mass., U.S.A.

Allan, A. A.
McGaw Hall, Cornell University,
Ithaca,, N. Y., U.S.A.

Allin, A. E.
Provincial Laboratory
Fort William, Ont..

American Museum of Natural History,
77th Street and Central Park W.
New York, N.Y., U.S.A.

Anderson, E. G.,
Division of Botany,
Central Experimental Farm
Ottawa, Ont.

Anderson, R. M.
58 Driveway
Ottawa, Ontario

Anderson, Roy,
Camrose, Alta.

Angus, W. F.
Box 280,
Montreal, P. Q.

Army Air Force —— Arctic, Desert & Tropic Information Centre,
25 Broad St.,
New York, N. Y. U.S.A.

Austin, O. L.
Tuckahoe,
Westchester Co., N.Y., U.S.A.

—B—

Baillie, J. L. Jr.,
Royal Ontario Museum
Bloor Street,
Toronto, Ont..

Ball, S. C.
Curator, Dept of Zoology,
Peabody Museum,
New Haven, Conn., U.S.A.

Banim, F. E.
St. Patrick's College
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Box 56,
Meaford, Ont..

Bennett, Chas. H.
80 Belmont Ave.,
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140 High Street,
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450 Bradford Street,
Pasadena, Cal., U.S.A.

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172 Metcalfe St.,
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Boston Society of Natural History
234 Berkeley Street
Boston, Mass., U.S.A.

Bowers, Henry
247 Fourth Avenue
Ottawa, Ont..

Boy Scouts' Association,
Canadian General Council,
Wellington Street, Ottawa, Ont..

Brandt, Herbert
11945 Carlton Road,
Cleveland, Ohio, U.S.A.

Brereton, E. L.
Box 99,
Barrie, Ont..

Brewer, Mrs. G.
155 Arlington St.,
Ottawa, Ont..

Brewer, Winnifred,
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Ottawa, Ont..

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104 Cameron Street
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Division of Entomology,
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36 Kent Street,
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46 Roxborough Apts.,
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Champion, Mrs. J. A. C.
46 Roxborough Apts.,
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National Parks Bureau
Dept. of Mines and Resources
Ottawa, Ont..

Clarke, Fl./O. Mary A.
214 Holmwood Avenue,
Ottawa, Ont..

Clemens, Dr. W. A.
University of British Columbia,
Dept. of Zoology,
Vancouver, B C.

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2717 Euclid Avenue..
Cleveland 15, Ohio, U.S.A..

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719 Island Park Drive,
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Cooch, Graham
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Ottawa, Ont..

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Apt. 23, 859 Thurlow St.,
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Dept. of Zoology,
University of Toronto,
Toronto, Ont..

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Univ. of British Columbia,

Cowan, Miss M. E.
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Port Arthur, Ont..

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4121 Marlowe Avenue
N.D.G., Montreal, Que..

des Rivieres, H.
86 St. Louis Road, Apt. 6,
Quebec, P. Q..

Devitt, O. E.
218 Eglinton Ave., East
Toronto, Ont..

Dickenson, Miss Mary
155 Cobourg St.,
Ottawa, Ont..

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Department of Biology,
Dalhousie University,
Halifax, N. S..

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Lakefield, Ont..

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Curator of Mammalogy
Carnegie Museum,
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Royal Ontario Museum,
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Court House,
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Bayswater Avenue,
Ottawa, Ont..

Edwards, R. Y.
426 Castlefield Avenue,
Toronto, Ont.,

Elton, C. S.,
Bureau of Animal Population,
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29 Old Mill Terrace
Toronto, Ont.,

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21 Second Ave.,
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—F—

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Vancouver, B. C.

Frith, Rowley
65 Butternut Terrace
Ottawa, Ont..

Fry, J. D.
Ciba Bldg.,
1235 McGill College Avenue,
Montreal, P. Q..

—G—

Gardner, C. C.,
Canadian Trade Corp., Ltd.,
1332 William St.,
Montreal, P. Q..

Gardner, Dr. G.,
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Goodwill, E. V.
Hydrographic Surveys,
Dept. Mines and Resources,
Ottawa, Ontario

Gould, E.,
Apt. 34, 25 Gilmour St.,
Ottawa, Ont.

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Indian Affairs Branch,
Ottawa, Ont..

Gross, A. O.
Bowdoin College,
Brunswick, Me., U.S.A.

Groves, J. W.
Division of Botany,
Central Experimental Farm,
Ottawa, Ont.

—H—

Halferdahl, Mrs. A. C.
140 Minto Place,
Rockliffe Park
Ottawa, Ont..

Hall, E. R.
University of California,
Berkeley, Cal., U.S.A.

Hamilton Bird Protection Society
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Aylmer, Que..

Harkness, W. J. K.
Department of Biology
Toronto University
Toronto, Ont.

Harper, Francis
224 S. Chester Road,
Swarthmore, Penn., U.S.A.

Hart, J. L.
Pacific Biological Station
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Hart, W. S.
Province of Quebec Society for Protection of Birds,
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Whittier College,
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Newburgh, Ont..

Hess, Quimby
Box 543,
Kapuskasing, Ont.

Hewitt, Oliver H.,
National Parks Bureau,
Department of Mines & Resources
Ottawa, Ont..

Hickey, Dr. M. Allan
Royal Edward Laurentian Hospital
Ste. Agathe des Monts, P. Q.

Hill, J. E.,
Am. Museum of Natural History,
Central Park West at 79th St.,
New York 24, N.Y., U.S.A.

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Lindsay Cottage,
Crescent, B. C.

Houston, C. Stewart
Box 642,
Yorkton, Sask.

The Manager, Fur Trade Dept.
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Humphrey, S.
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Hunter, Fenley
Box 96, Flushing, L.I.,
N. Y., U.S.A.

Huntsman, A. G.
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Toronto, Ont..

—I—

Ide, F. P.
Department of Biology,
University of Toronto
Toronto, Ont..

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—J—

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College of Liberal Arts,
Durham, N. H., U.S.A.

Jackson, H. A. C.
35 Campbell Ave.
Montreal West, P.Q.

Jameson, E. W. Jr.,
179 Highland Ave.,
Buffalo, N. Y.

Jaquith, Mrs. L. E.
72 Hudson Drive,
Toronto, Ont..

Jarrett, H. V.,
312 Second Ave.,
Ottawa, Ont.

Judd, Wm. W.
297 Glen Road,
Toronto, Ont..

—K—

Kansas University
Periodical Dept.,
Lawrence, Kans., U.SA..

Kidd, H. M.
McKenzie Island, Ont..

Kilby, Roy L.
5684 Aberdeen St.,
Vancouver, B. C.

Kindle, E. D.
337 Main Street,
Ottawa, Ont..

Kindle, C. H.
Dept. of Geology,
City College,
New York, N. Y., U.S.A.

Kitto, V.
R. R. No. 1, Malton, Ont.

Krug, Bruce A.
Chesley, Ont..

—L—

Laing, H. M.
Comox, B. C.

Lanceley, W. H.
23 Elmdale Avenue,
Ottawa, Ont..

Lanning, Robert G.,
56 Chatsworth Drive,
Toronto, Ont..

La Rocque, A.
156 Goulbourn St.,
Ottawa, Ont..

Laval University
Faculte des Sciences,
Quebec, P. Q.

Lawrence, A. G.
City Health Department,
Winnipeg, Man..

Leechman, D.
National Museum,
Ottawa, Ont..

Leim, A. H.
P.O. Box 254,
St Andrews, N. B..

Leith, Prof. E.
University of Manitoba,
Winnipeg, Man..

Leopold, Aldo
424 University Farm Place,
Madison 6, Wis., U.S.A.

Lepingwell, A. R.
47 Dorval Ave.,
Dorval, P. Q.

Lewis, Grace S.
Dominion Bureau of Statistics,
Ottawa, Ont..

Lewis, Harrison F.
c-o National Parks Bureau,
Dept. of Mines and Resources,
Ottawa, Ont..

Livingstone, Miss May E.,
999 Carling Ave.,
Ottawa, Ont..

Lloyd, Hoyes,
582 Mariposa Ave.,
Rockcliffe Park,
Ottawa, Ont.

Lloyd, Wilmot,
582 Mariposa Ave.,
Rockcliffe Park
Ottawa, Ont.

Logier, Shelly,
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University of Manitoba,
Winnipeg, Man..

Lucas, Alec.
R. R. 6,
Cobourg, Ont..

—M—

Mack, H. G.
c-o Gilson Manufacturing Co.,
Guelph, Ont..

MacLulich, D. A.
144 Mavety Street,
Toronto, Ont..

MacMeekin, Bertha
43 Florence St.,
Ottawa, Ont..

MacNamara, Chas.
Arnprior, Ont..

Magee, M. J.
603 South Street,
Sault Ste. Marie, Mich., U.S.A.

Maguire, W. S.
1503 Douglas Rd.,
New Westminster, B. C.

Maine, University of,
Library,
Orono, Maine, U.S.A.

Manitoba Natural History Society,
Winnipeg Auditorium Museum,
Memorial Blvd.,
Winnipeg, Man.

Manitoba, Province of,
Game and Fisheries Br.,
254 Legislative Bldg.,
Winnipeg, Man..

Manitoba, University of
Science Library,
Fort Garry Site,
Winnipeg, Man.,

Manning, T. H.
59 Electric St.,
Ottawa, Ont.

Marcotte, Leon,
St. Charles Seminary,
Sherbrooke, P. Q.

Marine Biological Laboratory
Woods Hole,
Massachusetts, U.S.A

McCabe, T. T.,
2731 Prince Street,
Berkeley, Cal., U.S.A.

McCalla, W. C.
1312 Ninth St., N.W.
Calgary, Alta.

McDougall, E. G.
Royal Ontario Museum,
Toronto, Ont..

McFadden, R W. E.
4 Hart Street,
Brantford, Ont..

McGahey, Miss Pearl,
193 O'Connor Street,
Ottawa, Ont..

McGill University Library,
3459 McTavish Street,
Montreal, P. Q..

McIlwraith Ornithological Club,
c-o Mrs. Frances Girling,
537 Colborne St.,
London, Ont..

McIlwraith, T. F.,
50 St. Leonard's Avenue,
Toronto 12, Ont..

McKeever, J. L.,
516 Homewood Avenue,
Peterborough, Ont..

McKinnon, Mrs. J. S.,
24 Jeanne d'Arc Street,
Hull, P. Q.

McLearn, Dr. F. H.
Geological Survey,
Dept. of Mines and Resources.
Ottawa, Ont.

Meredith, R.
93 St. Peter Street,
Quebec, P. Q.

Merrick, L. F.,
19 Ravenscliffe Ave.,
Hamilton, Ont.

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Division of Botany,
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Ottawa, Ont..

Missouri, University of,
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Mitchell, Mrs. O. S.,
R.R. No. 1,
Streetsville, Ont..

Moeran, E. H.,
541 Bronx River Road,
Yonkers, N.Y., U.S.A.

Montomery, F. H.,
11 Earl St.,
Kitchener, Ont..

Montreal Mechanics' Institute,
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—Z—

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CONTENTS

PAGE

Birds of the Alaska Highway in British Columbia. By A. L. Rand 111
Potamogeton crispus L. in Alberta. By Herbert Groh 126
Edgar Melville Serle Dale. By John Dearness 127
The Smelt Situation in the Upper Great Lakes, Ontario, May, 1943. By J. C. Stevenson 128
Vascular Plants Collected on Kiska and Great Sitkin Islands in the Aleutians by Lt. H. R. McCarthy and Cpl. N. Kellas, August, September and October, 1943. By A. E. Porsild 130
The Occurrence of Starfish in the Lower Cretaceous of the Peace River Valley By F. H. McLearn 132
Christmas Bird Census - 1943 135
Notice of Motion. (P. Snure). 141
Notes and Observations:—
The Screech Owl in Central Alberta. By Frank L. Farley 142
A Positive Pyrotropism. By C. H. D. Clarke 142
Saskatchewan Records of the Whooping Crane. By Frank L. Farley 142
Book Reviews 125, 129
News of Naturalists 129
Current Literature 134

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VOL. 58 SUTTON WEST, CANADA JULY-AUGUST, 1944 No. 4

BIRDS OF THE ALASKA HIGHWAY IN BRITISH COLUMBIA[1]

35,343

By A. L. RAND

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I SPENT the period July 10 to Sept. 19, 1943, on the Alaska Highway between Dawson Creek and Watson Lake, with most of the time in the Fort Nelson — Watson Lake area, studying birds and mammals. The report on the mammals, with an account of the trip and a detailed description of the country is appearing elsewhere[2], so but a brief introduction will be given here.

The work was carried on under the auspices of the National Museum of Canada, with funds from the National Parks Branch of the Canadian Government.

Dr. M. Y. Williams, of the University of British Columbia, who was doing geological work along the Alaska Highway for the Dominion Government supplied me with transport and messing facilities. To him I am indebted for much assistance as well as notes on birds that he saw. In Edmonton Mr. L. E. Drummond expedited my preparations for the summer's work. The United States Army personnel along the Highway gave me a great deal of assistance, and to them and in particular to Colonel Henderson in charge of the Dawson Creek area, I am indebted for many courtesies and much assistance, including housing, transportation and messing facilities that made my work possible.

There had been no previous detailed ornithological studies in this area, though for comparison there are two excellent studies; "The Vertebrate Fauna of the Peace River District of British Columbia" (Cowan, 1939, *Occ. Papers of the B. C. Prov. Mus.* No. 1) and "A List of the Birds of the Atlin Region, British Columbia" (Swarth, H.S., 1936, *Proc. Calif. Acad. Sci.* (4), 23, pp. 35-58).

That part of the Alaska Highway I covered (see map) is marked with Mile posts that are useful in referring to localities. They were in three series, 0 to 48 from Dawson Creek to Fort St. John; 0 to 258 J., from Fort St. John to Fort Nelson, and 0 to 352 N., from Fort Nelson to Watson Lake, the letter distinguishing the series. Due to relocation of parts of the road these mileages are only approximate.

The following is a summary of my itinerary:

July 10 — Dawson Creek ..... Mile 0

July 11 — to Blueberry Relay Station ..... Mile 53J.

July 12-17 — at Trutch Relay Station ..... Mile 157J.

July 17-19 — at Fort Nelson Relay Station ..... Mile 258J. or 0N.

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Aug. 4-14 — at Lower Liard Crossing camp ..... Mile 213N. with trips to Smith River

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Aug. 24-28 — at Muncho Pass camp ..... Mile 165N.

Aug. 28-Sept. 8 — at Summit Pass camp ..... Mile 104N.

Sept. 8-15 — at Steamboat Mountain or (Gardiner's Creek) camp...Mile 64N.

Sept. 15-18 — at Muskwa Crossing camp ..... Mile 252J.

Sept. 19 — to Buckinghorse River ..... Mile 134J.

Sept. 19 — to Dawson Creek ..... Mile 0.

1. —Received for publication March 15, 1944

2. —1944, Nat. Mus. Can. Bull. No. 98, pp. 1-50

Vol. 58, No. 3, May-June, 1944, was issued August 26, 1944.

The following are a few notes on the country,—

From Dawson Creek to about Mile 45 N., the road lies east of the Rockies, crossing broad valleys and over hills up to 4000 feet altitude between the headwaters of the Peace and the Liard Rivers. From Mile 50 N. to 94 N., the road is in the hilly country, fronting the Rockies. From Summit Pass, Mile 102 N., where the road reaches its highest point, 4200 feet to Mile 198 N., near the Lower Liard Crossing, and again on the Liard River at Mile 220 N., the road is in or skirting the northeastern end of the Rockies, which rise commonly to 6000 - 8000 feet altitude near the road. From twenty miles above the Lower Liard Crossing to Watson Lake the road follows up the Liard River in a broad valley of ridges and lateral valleys.

The tops of the Rockies rise as grey rock peaks and screes, bare of vegetation; on their slopes is a band of alpine grassland, in general between 4000 and 6000 feet. Below this are the forests, of pine, aspen and spruce, and some white birch, that covered practically all of the country after the wheat fields about Fort St. John have been left behind. Much, if not all this country has been burned over within the last hundred years so that young forest and second growth predominates. Muskegs are not uncommon, but marshes and lakes are few.

I arrived in this area late in the season for bird work. Many species had stopped singing, and it is possible that some had finished breeding and left the area. A survey in spring and early summer would probably give a quite different account of the relative abundance and distribution of the birds. The gaps in the summer records of many species are as striking as the presence of others.

There were no waterfowl breeding areas of importance, and few places for waterfowl to stop in migration. Hawks were not common until the fall migration when a number were seen. Ptarmigan probably occur on all the higher mountains, but in places at least they are seasonal in occurrence. A striking feature of the bird-life was the migratory hordes of sparrows that appeared in Summit Pass about Sept. 1.

Among the more interesting records are the first record of the Barred Owl and Palm Warbler for British Columbia; the Black Turnstone, recorded for the second time away from salt water; the Bay-breasted Warbler collected for the third time in the province; the northern extension of the range of MacGillivray's Warbler, and the House Sparrow in the isolated settlement of Fort Nelson.

The following list of 114 species and annotations is based chiefly on my own observations, and a collection of 56 species supplemented by Dr. Williams' observations, and such other data as I was able to glean from persons whom I met along the Highway.

ANNOTATED LIST OF BIRDS

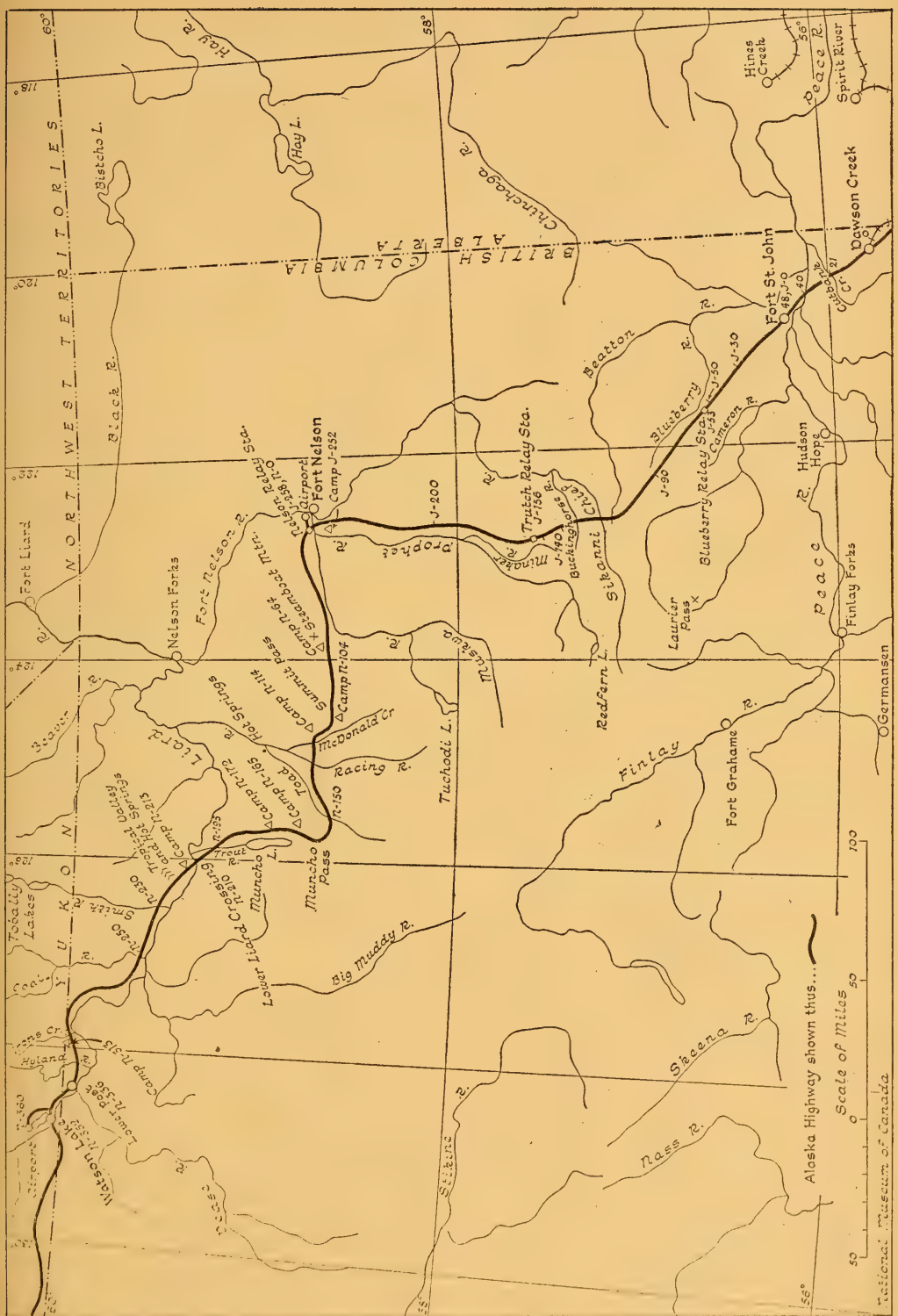
1. **Greater Common Loon.** *Gavia immer immer* (Brunnich).— Occasionally seen on Muncho Lake, July 27-30; 3 were the most seen at one time; a Public Roads Administration engineer said loons had nested on a little islet near the northern end of the lake, but the nest had been broken up. On the little lake at Mile 298 N., an adult with two partly grown young was seen on August 20. At Summit Lake one was seen flying over, going northward on September 4.

No specimens were collected, but material from Teslin Lake and elsewhere supports Peters' view (1931, *Birds of the World*, Vol. 1, p. 35) that *immer* ranges all across Northern Canada at least.

2. **Pacific Loon.** *Gavia arctica pacifica* (Lawrence).— Two and sometimes three birds, all in breeding plumage, were seen on the little lake back of our Mile 313 N. camp just north of Irons Creek Valley, during our stay there September 15 to 19; a desiccated carcass of an adult bird was found washed up on the shores of the little lake near the Smith Valley airport on September 12. No evidence of breeding was found.

3. **Holboell's Grebe.** *Colymbus grisegena holboelli* (Reinhardt).— Two birds, still in breeding dress, were seen on the lake at Mile 298 N. on September 14.

4. **Canada Goose.** *Branta canadensis* subsp.?.— According to local information geese breed sparingly all along the Liard River, wherever there are suitable backwaters and marshy spots. Mr. Macdonald at Lower Post said that


NORTH WEST TERRITORIES
BRITISH COLUMBIA
Hay L.
Bistcho L.
Black R.
Fort Liard
Nelson Forks
Fort Nelson R.
Fort Nelson
Airport
Camp J-252
Camp J-200
Prophet R.
Trutch Relay Sta.
J-136
Minaker R.
J-140
Buckinghorse R.
Sikanni Chief R.
Sikanni
Redfern L.
Laurier Pass
Blueberry Relay Sta.
J-50
J-30
J-90
Beaton R.
Blueberry R.
Cameron R.
Hudson Hope
Peace R.
Finlay Forks
Germansen
Finlay R.
Fort Grahame
Tuchodi L.
Racing R.
McDonald Cr
Camp N-104
Camp N-118
Camp N-172
Camp N-165
Camp N-195
Camp N-213
Camp N-230
Camp N-250
Camp N-315
Camp N-336
Camp N-360
Summit pass
Trout R.
Muncho L.
Muncho Pass
Big Muddy R.
Laurent Lake
Toad R.
Liard R.
Smith R.
Coal R.
Tobaly Lakes
Wilson Lake
Sikanni R.
Sikanni
Sikanni R.
Sikanni
Nass R.
Sikanni R.
Sikanni
Alaska Highway shown thus...
Scale of Miles
0 50 100
Fort St. John
Dawson Creek
Hines Creek
Spirit River
Peace R.
Chetwynd
Chetwynd
Chetwynd

a few breed locally, and a good few drifted down the river in the fall; Mr. Tom Mould told me that on August 5, 1943, he saw a party of six geese, adults and young, on the Liard River a short distance below the crossing at Mile 213 N. At the Army post, Mile 260 N., were six young geese raised in captivity that had been taken locally. From their small size they suggested *leucopareia*. Taverner (1931, *Ann. Rept. 1929, Nat. Mus. Can.*, Ottawa, p. 34) tentatively regards specimens from nearby Teslin Lake as *leucopareia*, while Cowan (1939, *Occ. Papers B. C. Prov. Mus.*, No. 1, p.7) and Taverner (*op. cit.*, p. 31) refer Peace River specimens to *canadensis*.

5. **Common Mallard.** *Anas platyrhynchos platyrhynchos* Linnaeus. —Only full grown birds in female plumage were seen, as follows: a flock of 7 on August 13, on the little lake at Mile 237 N., near Smith River; from 1 to 4 were seen daily on the little lake at Mile 313 N. camp near Irons Creek, August 15 to 20; two were seen at Watson Lake, August 16. One specimen was collected near Irons Creek. August 18, 1943.

6. **Baldpate.** *Mareca americana* (Gmelin). — Only full grown birds in female plumage, evidently in fall migration, were seen as follows: on August 13 a party of four was seen on the Smith River near the road; on September 6, twenty. September 7, twelve and September 8, two birds were seen on the little lake in front of our Summit Pass camp at Mile 104 N.

7. **American Pintail.** *Dafila acuta tzitzihoa* (Vieillot). —Fall migrants, all in female plumage, were seen as follows: three on September 1 and two on September 8 on the little lake in front of our camp in Summit Pass at Mile 104 N.

8. **Green-winged Teal.** *Nettion crecca carolinense* (Gmelin). —This teal nests near Summit Lake, as on September 4 Dr. Williams found a nest and eggs on the margin of a little grass fringed pond near the road at Mile 94 N. The nest was partly flooded, and the eggs were in the water. Two of them were saved. However, only fall migrants, in female plumage, were seen as follows: a party of six on the pond in Muncho Pass at Mile 165 N. on August 26 and 27; from one to twelve birds on the little lake in Summit Pass at Mile 104 N., from September 1 to 8. These last were very tame, and it was possible to walk within ten feet of them as they dozed on the shore or dabbled in shallow water.

9. **Shoveller.** *Spatula clypeata* (Linnaeus).— A flock of about 20 birds, in female plumage, spent the day on the little lake at Mile 104 N., in Summit Pass on September 8. A certain amount of antagonism was shown toward a solitary green-winged teal, that was sometimes nipped at and pecked when it tried to join the flock.

10. **Buffle-head.** *Charitonetta albeola* (Linnaeus).— A single female plumaged bird was seen on the little lake at Mile 104 N. in Summit Pass, on September 8.

11. **Western Harlequin Duck.** *Histrionicus histrionicus pacificus* Brooks.— Found breeding on a small tributary of the McDonald Creek near Mile 114 N., (altitude about 3,300 feet), where an adult male in full plumage was seen on July 20; an adult male and two female plumaged birds, all strong on the wing, and a downy young on July 21. The small, downy young was alone, and peeping plaintively, on a boulder-strewn, recently flood-disturbed valley bottom. Apparently the flood that had occurred a short time before had broken up the family, and perhaps resulted in some duck mortality in this manner. Dr. Holland told me that in early July, on the Sikanni Chief River, he saw 8 or 9 of these birds between where the river crosses the Highway and a point some 30 miles upstream.

An adult male and a downy young specimen were collected. The male shows the large bill and pale head stripes characteristic of this form.

12. **Surf Scoter.** *Melanitta perspicillata* (Linnaeus).— Only one seen; an adult male in full plumage on Muncho Lake, near Mile 175 N., on August 24.

13. **American Common Merganser.** *Mergus merganser americanus* Cassin.— A female with seven young was seen on Muncho Lake, July 29, and on August 4, a female with five half-grown young was seen. They swam boldly out into the lake, and it is possible that lake trout may feed on these birds.

14. **Eastern Goshawk.** *Accipiter gentilis atricapillus* (Wilson).— Occasionally seen during the summer; breeding at Muncho Lake, and probably elsewhere, becoming commoner and

more conspicuous in migration in August and September.

Dr. Williams saw this species near Steamboat Mountain (near Mile 65) in late June; a fresh tail feather of an immature was picked up at Mile 114 N., near the McDonald Creek July 20; an immature, full grown bird, squealing in the forest as though it were still in the vicinity of its nest and expecting to be fed by the parents, was seen at the head of Muncho Lake, July 27; Dr. Williams saw an adult near the Hot Springs on the Liard (Mile 213 N.) on August 8, and I saw another; near the Hyland River at Mile 325 N., one was seen soaring high in the air; single immature birds were seen August 24 at Mile 210 N., (near Liard Crossing) and on the Trout River; August 25 two immature birds were seen in Muncho Pass (Mile 165 N.); next seen at Steamboat Mountain, where one was seen on September 9; four on September 10; one on September 13, all immatures; two immatures were seen at the Muskwa River, September 17.

Two immature specimens, taken September 9, 10 near Steamboat Mountain, compare well with eastern birds.

15. **Sharp-shinned Hawk.** *Accipiter striatus velox* (Wilson).— Breeds at least near the Liard River Crossing (Mile 213 N.) and seen not uncommonly in the fall from there to Steamboat Mountain.

Dr. Williams saw one near Summit Pass at Mile 108 N., on July 20; near the Liard River Crossing (Mile 213 N.), on August 3 I found a group of full grown young sitting about squealing in slender, young mixed forest, as though they were in the vicinity of their nest, and still expecting to be fed by their parents; two were collected; single birds were seen at the Liard Crossing, August 7, 22 and 24; one in Muncho Pass, August 27; one in Summit Pass on September 3; and one near Steamboat Mountain September 9.

The two immatures collected compare fairly well with eastern specimens.

16. **Harlan's Red-tailed Hawk.** *Buteo jamaicensis* subsp.?.— A scarce bird in this area. A normal coloured bird was seen just north of Trutch at Mile 179 J. on July 17; four melanistic birds were seen about the Liard Crossing, August 4 to 10; another melanistic specimen was seen about Mile 246 N., and a normal coloured example at Mile 298 N., on August 14; a melanistic specimen was shot at Mile 324 N., on August 17; and another seen near the Muskwa River (Mile 252 J.) on September 17.

Several of the melanistic birds showed some red in the tail. The stomach of the specimen collected was empty.

The single specimen collected August 17 near the Hyland River, Mile 324 N., is an immature in the dark phase, with some white and rust coloured markings, especially in the breast and some rust in the barred tail. On plumage characters it might be referred to either *"calurus"* or *harlani.*

17. **American Rough-legged Hawk.** *Buteo lagopus s.-johannis* (Gmelin).—Two were seen, evidently in migration, near Muskwa (at Mile 252 J.) on September 17.

18. **American Golden Eagle.** *Aquila chrysaetos canadensis* (Linnaeus).— Dr. Williams saw a pair of these birds circling about Steamboat Mountain (Mile 165 N.), in June.

19. **Northern Bald Eagle.** *Haliaeetus leucocephalus washingtoniensis* (Audubon).— A single adult was seen at Muncho Lake on July 27 and 30, and a pair of adults at Watson Lake on August 16.

A Highway engineer told me that in late July he saw a Bald Eagle's nest in a tree on a point on the west side of Muncho Lake, and at that time there were two young birds in the nest.

20. **American Marsh Hawk** or **Hen-Harrier.** *Circus cyaneus hudsonius* (Linnaeus).— One was seen on July 17 over the marshy ground along the Minaker River near Trutch (Mile 157 J.); another in Muncho Pass August 27; and another near Trutch (Mile 167 J.) on September 18.

21. **American Osprey.** *Pandion haliateus carolinensis* (Gmelin).— Only one seen, September 8, above the Tetsa River near Mile 172 N. It was carrying a Dolly Varden trout, about 15 inches long.

22. **Eastern Pigeon Hawk.** *Falco columbarius columbarius* Linnaeus.— Not seen until the white-throated sparrows began to migrate in abundance, then the following were recorded: September 1, two, September 2, one, and September 3, three in Summit Pass; and one

near the Muskwa (Mile 252 J.), on September 17.

Two specimens were collected September 3 and 4, at Summit Pass. These specimens compare well with typical *columbarius* from Eastern Canada. I agree with Swarth (1935, *Condor*, 37, pp. 201, 202) that *bendiri* is not recognizable. No *suckleyi* were seen, though they occur in about equal numbers with *columbarius* in the Atlin region.

23. **American Sparrow Hawk.** *Falco sparverius sparverius* Linnaeus.— Apparently not uncommon; recorded as follows: July 17, one seen north of Trutch (Mile 177 J.); July 28, two were seen at Muncho Lake; August 5, two were seen at the Liard Crossing (Mile 213 N.); August 12, a male and female seen in Smith Valley near the airport; on August 14 saw 3 between Smith River and Irons Creek, along the road; during our stay at Irons Creek camp, August 14-20, one was seen daily about the camp clearing; on August 24 about six were seen along Trout River and Muncho Lake; September 1-8, fairly common in Summit Pass, up to 4 being seen in a day; on August 26 and 27, single birds were seen by Dr. Williams about Steamboat Mountain.

One specimen was collected on September 2 in Summit Pass.

24. **Richardson's Dusky Grouse.** *Dendragapus obscurus richardsoni* (Douglas).— I saw none, but from information from various sources the species, under the name of Blue Grouse appears to be present at a number of localities; Dr. Williams saw a female with young near Steamboat Mountain in June; Mr French, B.C. Forest Ranger, told me of seeing two on the hills above Mile 96 N. (near Summit Pass) in August; Tom Mould had not seen the species in his trap line just north of the Liard Crossing (Mile 213); John Dall and Mr. MacDonald of Lower Post had not seen it in that area, but the former said it occurred on the upper Hyland River.

25. **Canada Spruce Grouse.** *Canachites canadensis canadensis* (Linnaeus).— A fairly common species in young spruce and pine forests. We recorded birds at Trutch; Steamboat Mountain; Toad River; Muncho Pass; Muncho Lake; Smith River; near Irons Creek; and were told it occurred at Lower Post.

Three specimens were collected, an immature male on the Smith River on August 13; and two females, one at Muncho Lake on July 28, and one at Steamboat Mountain on September 9. The Muncho Lake specimen had the crop well filled with the green stems and branches of the abundant horsetail (*Equisetum*).

For reasons for not accepting the race *osgoodi*, see Taverner, in Soper, 1942, Trans. Roy. Can. Inst., 24, p. 46, and Uttal, 1939, Auk, 56, p. 461.

26. **Yukon Ruffed Grouse.** *Bonasa umbellus yukonensis* Grinnell.— Not uncommon in deciduous forests at lower altitudes; at Steamboat Mountain in September four single birds, all wild, were seen; on the McDonald Creek, Mile 114 N., in July, four were seen; at the Liard Crossing, Mile 213 N., in August, about six different covies of young birds, of 4 to 6 birds each, were located, and all were very tame; three birds were seen at Irons Creek.

The young birds, nearly full grown, at the Liard Crossing were as tame as Spruce Grouse ordinarily are.

Three birds in juvenile plumage were taken at the lower Liard Crossing, Mile 213 N., August 6 and 7. I am following Aldrich and Friedmann (1943, Condor, 45, pp. 85-103) in referring Liard River birds to *yukonensis*. The race *umbelloides* occurs at least in the Peace River area.

27. **Rock Ptarmigan.** *Lagopus mutus rupestris* (Gmelin).— Dr. Raup told me of seeing Ptarmigan above timberline on the mountains above Summit Pass in July, and I saw a single individual there August 30.

Ptarmigan signs, droppings and old shed, white feathers possibly of this species, were seen amid alpine conditions on the mountains above Muncho Pass and Muncho Lake.

28. **Ptarmigan sp.?.**— Tom Mould told me that in the bare topped Caribou Mountains to the north of the Liard River Crossing (Mile 213 N.), he has seen Ptarmigan in flocks of up to 50 and 60 birds. MacDonald, at Lower Post, says Ptarmigan are common in that country in the winter. Probably these latter birds at least are Willow Ptarmigan (*Lagopus lagopus*).

29. **Northwestern Sharp-tailed Grouse.** *Pedioecetes phasianellus caurus* Friedmann.— None seen, but Tom Mould tells me that they

occur on his trap line just north and east of the Liard Crossing (Mile 213 N.), and each winter he sees a flock of 6 to 8 birds.

Friedmann (1943, *Jour. Wash. Acad. Sci.*, 33, pp. 189-191) in a revision of the species refers specimens from Lake Tagish and extreme northeastern Alberta to this form. Peace River specimens were identified as *campestris* Ridgway by Cowan (1939, *Occ. Papers B.C. Prov. Mus.*, No. 1, p. 27), a name that was then current for the birds of Alberta that Friedmann refers to *jamesi*. A single specimen from Montyaneuse River, 15 miles from Fort St. John (M.Y. Williams' coll.) compares well with specimens of *jamesi* Lincoln from Central Alberta, and is referable to that form.

30. **Little Brown Crane.** *Grus canadensis canadensis* (Linnaeus).— Common in migration; many people told me that immense numbers go down the valleys of the Liard, Muskwa and Peace in the fall. Flocks were heard going over Summit Pass on September 1; near Muskwa (Mile 252 J. and 256 J.) a flock of about 300 went over high on the afternoon of September 15; on September 16, a flock of about 150 went over; and on September 17, between 9 a.m. and 7 p.m., seven flocks went over our camp. These flocks varied in size from 35 to 91 birds. Some were only a couple of hundred yards up; others were nearly out of sight; all were in a V or a diagonal line formation, and the calls of even the highest came plainly to earth; they were all going in a southeast direction. Later in the evening at least four more flocks went over, and I woke in the night to hear others. An estimated 500 birds went over in daylight on this day, and probably as many more were in the flocks after dark.

31. **Black Turnstone.** *Arenaria melanocephala* (Vigors).— At Watson Lake on August 16 I saw four of these unmistakable birds at close range They were very tame, sitting on the narrow sandy beach just under the end of the airplane runway, and were associated with least, semipalmated, Baird's and spotted sandpipers.

This is the second time this species has been recorded away from the salt water of the Pacific Coast. The other record is of a single bird at Atlin, B.C. (1936, Swarth, *Proc. Calif. Acad. Sci.*, (4) 23, No. 2, p. 43).

32. **Wilson's Snipe.** *Capella delicata* (Wilson). I saw little suitable breeding ground for this bird, and saw it only in fall migration at the little lake in Summit Pass at Mile 104 N. Thirteen birds were seen between September 1 and September 7. They rested and fed during the day, and were seen in flight, singly or in couples going south during the early evening.

33. **Upland Plover.** *Bartramia longicauda* (Bechstein).— Two records: a bird of the year taken on the road through burned jack pine country near Smith Valley airport on August 12, and one seen by Dr. Williams on the Coal River on August 21.

34. **Spotted Sandpiper.** *Actitis macularia* (Linnaeus).— A common, well distributed bird among open stream and lake margins, probably breeding throughout the area; recorded at: Summit Pass, McDonald Creek, Muncho Pass, Muncho Lake, Smith Valley, near Irons Creek, Dease River near Lower Post and Watson Lake.

Downy young were seen on the McDonald Creek (Mile 114 N.) July 22, and at Watson Lake on August 16. These latter, though still with much down on them, were just able to fly a short distance.

The latest bird seen was on September 1 at Summit Pass.

35. **Western Solitary Sandpiper.** *Tringa solitaria cinnamomea* (Brewster).— Seen only in fall migration, as follows: July 28, one about the inlet to Muncho Lake; August 7-10, four birds seen at various times on the margin of the old beaver pond near the Hot Springs at the Liard Crossing (Mile 213); Dr. Williams saw another there on August 20.

Both *cinnamomea* and *solitaria* occur in migration in British Columbia, with a preponderance of the former. However, summer residents, probably breeding, from the Peace River area and Atlin were *cinnamomea* (Taverner, 1940, *Condor*, 42 pp. 215-217).

36. **Lesser Yellowleg.** *Totanus flavipes* (Gmelin).— One, possibly a breeding bird, was seen on July 17 at Mile 210 J., flying about an area of muskeg, and lighting on the tops of spruces. Migrating birds were seen as follows: 3 came into an old beaver pond near the Liard Crossing (Mile 213 N.) on August 5 to feed for a half hour before

moving on; on August 14 one was heard at the little lake at Mile 298 N.

37. **Baird's Sandpiper.** *Erolia bairdi* (Coues).— Two, evidently migrants, were seen August 16 at Watson Lake. They were on the little sandy beach just under the end of the airplane runway.

38. **Least Sandpiper.** *Erolia minutilla* (Vieillot).— Recorded twice; four on August 16 on the little sandy beach at the end of the airplane runway on Watson Lake airport; and a lone bird which I collected on September 2 on the shores of the little lake in Summit Pass at Mile 104 N.

39. **Semipalmated Sandpiper.** *Ereunetes pusillus* (Linnaeus).— Fall migrants were recorded twice as follows: a lone bird, probably this species, on the edge of a beaver pond in the McDonald Creek Valley near Mile 114 N., July 22, and one bird, definitely this species, on August 16 on the little sandy beach at the end of the airplane runway on Watson Lake.

40. **Northern Phalarope.** *Lobipes lobatus* (Linnaeus).— A lone bird was seen by Dr. Williams on September 4 on a little pond in a forested lateral valley of the Tetsa River, near Mile 94 N.

41. **Herring Gull.** *Larus argentatus smithsonianus* Coues.— Occasionally seen; no breeding stations discovered; recorded as follows: Summit Pass, August 30, four adults; August 31 four adults, one immature; September one adult; all seen flying over; Toad River near Mile 150 N., a flock of about 12 seen July 27 by Dr. Williams was probably of this species; Muncho Lake, flocks of adult gulls containing up to 12 birds were occasionally seen between July 27 and August 4, and were probably this species; Liard River between Mile 213 and 220, lone adults seen August 12, 13 and 23; Smith River, near Highway, a solitary adult collected August 12; Watson Lake, an adult and an immature seen with 24 short-billed gulls.

The specimen is typical *smithsonianus*.

42. **Short-billed Gull.** *Larus canus brachyrhynchus* Richardson. Seen only at Watson Lake on August 16, when 22 immature and 2 adult birds were seen in company with 2 herring gulls. They spent part of the time resting on the lake, and part on the end of the airplane runway overlooking the lake. The frequent use of this runway by airplanes disturbed them but little, causing them to fly but a short distance.

43. **Bonaparte's Gull.** *Larus philadelphia* (Ord).— On Muncho Lake on August 30 three adults and one immature plumaged bird were seen, and on August 4 the dried-up wing of one was found at the Hot Springs near Mile 213 N.

44. **Dusky Great-horned Owl.** *Bubo virginianus saturatus* Ridgway.— Probably a common breeding bird throughout the area, but only heard commonly after September 8. It was recorded as follows: July 30, a fresh feather picked up at Muncho Lake; August 12, 13, 14, 20, 21 and 22, one hooted each evening at the Liard Crossing camp Mile 213 N.; September 9 to 11 at Steamboat Mountain camp two or more were heard each evening, and 2 very dark, blackish birds were seen in the day time; August 15 to 17, near Muskwa, Mile 252 J., several hooted each evening, and one came into camp.

Though I collected no specimens, the National Museum has material from near Fort Nelson and Teslin Lake that Taverner (1942, *Auk*, 59, pp. 234-245) has discussed. He identified the specimens as follows:

"*saturatus*" of 1931 A. O. U.
Check-list — — 1. Teslin Lake
"*lagophonus*" of 1931 A. O. U.
Check-list — — 2. Fort Nelson
3. Teslin Lake
"*subarcticus*" x "*saturatus*" of 1931 A. O. U.
Check-list — — 3. Teslin Lake

Taverner's conclusion was that *lagophonus* should be synonomized with *saturatus*, and that *saturatus* occupied British Columbia, intergrading with *subarcticus* along the eastern slope of the Rocky Mountains and in the Yukon Territory.

Cowan (1939, *Occ. Papers B.C. Prov. Mus.* No. 1, p. 34) recorded both very light *subarcticus* — like birds, and very dark *saturatus* — like birds from the Peace River area, and Swarth (1936, *Proc. Calif. Acad. Sci.*, 23, p. 46) did the same for the Atlin area.

45. **Northern Barred Owl.** *Strix varia varia* Barton.— On August 12 at the Liard Crossing camp, Mile 213 N., just at dusk I heard the characteristic call of this bird, from the

heavy poplar forest. I was able to shoot one, and later in the evening, heard another one call.

This is the first record of the species for British Columbia. Hitherto the species was known west to Manitoba, with a single record for the Athabaska River, Alberta (Preble, 1941, *Auk*, 58, pp. 407, 408).

46. **Richardson's Owl.** *Cryptoglaux funerea richardsoni* (Bonaparte).— Dr. Williams saw one of these little Owls one evening about July 8 near his camp at Mile 98 N., just below Summit Pass.

47. **Eastern Nighthawk.** *Chordeiles minor minor* (*Forster*).— Fairly common, and widely distributed throughout the area, breeding; recorded from Trutch to Irons Creek, and as high as 4,200 feet altitude. The burned country, gravelly stream margins, and natural openings in the forest provide abundant suitable places for this species to rest and nest.

Dr. Williams found a nest with 2 young in it on July 20, on the McDonald Creek near Mile 108 N.

The last bird of the season was seen August 29 at Summit Pass; last heard booming August 15 over Irons Creek.

48. **Belted Kingfisher.** *Megaceryle alcyon caurina* (Grinnell).— Probably occurs along all the larger streams; seen not uncommonly along the Liard River and its tributaries in August; some 12 birds being seen from August 7 to 20 between Mile 213 N. and Mile 336 N.; one seen, evidently in migration, about the little lake in Summit Pass on September 2.

An immature female, taken August 3 near the Liard River at Mile 237 N., has a wing length of 161 mm.

49. **Northern Yellow-shafted Flicker.** *Colaptes auratus luteus* Bangs.— A scarce bird, recorded as follows: Liard Crossing Mile 213 N., heard one August 6; Smith Valley near airport, saw a party of 5 in old burn, August 12; Smith River, near Highway, picked up a fresh flight feather August 13; mouth of Dease River saw one, August 17; at Steamboat Mountain one heard on September 10.

All the birds seen had distinctly yellow "wings" with no trace of red in them.

50. **Pileated Woodpecker.** *Ceophloeus pileatus* subsp.?— Dr. Williams heard one near the lower Liard Crossing on August 8. Mould knows these birds as occurring on his trap line to the north of the lower Liard Crossing.

51. **Yellow-bellied Sapsucker.** *Sphyrapicus varius varius* (Linnaeus).— In view of the abundance of this species in the Peace River area, where Cowan (1939, *Occ. Papers B.C. Prov. Mus.* No. 1 p. 36) records up to five pair to the acre, it was surprising that I found few of them, even on the Liard where conditions seemed ideal. I made the following records: August 10, Lower Liard Crossing, Mile 213, two collected; September 16, near Muskwa, two seen and one collected. All were in heavy poplar forest along the river flats.

52. **Northern Hairy Woodpecker.** *Dryobates villosus septentrionalis* (Nuttall). — One was seen in the old extensive burn in the Smith Valley, August 12.

53. **Nelson's Downy Woodpecker.** *Dryobates pubescens nelsoni* Oberholser. — One seen in a burned-over area, at Mile 226 J., on July 17.

54. **Arctic Three-toed Woodpecker.** *Picoides arcticus* (Swainson). — Dr. Williams saw one at close range on the Coal River.

55. **Alaska Three-toed Woodpecker.** *Picoides tridactylus fasciatus* Baird. — The scarcity of Woodpeckers of all species was striking. Records of this species follow: several were seen at Muncho Lake, in a recently burned area of spruce, July 24 to 29; one was found in heavy, mixed poplar-spruce forest near the Lower Liard Crossing Mile 213 N., on August 5; near Muskwa one was found in a recent poplar burn on September 16.

Four specimens were taken: at Muskwa River, September 7; Muncho Lake, July 30 and 31; and Lower Liard Crossing, Mile 213N., August 5.

56. **Eastern Kingbird.** *Tyrannus tyrannus* (Linnaeus). — One flew across the road in an area of low second growth at Mile 185J on July 17. This appears to be the most northerly record of the species for British Columbia.

57. **Say's Phoebe.** *Sayornis saya saya* (Bonaparte). — Only seen in fall migration as follows: Dr. Williams saw one August 7 on a bare hill above the Lower Liard Crossing and on August 10 one was about an old beaver

pond near the same place; August 12 two were seen about 20 miles up the Smith Valley, in an old burn, and on August 13 two were seen along the Smith River near the Highway. On August 14 seven were seen on the stretch of road along Liard Valley between Mile 277 and 313 N.

58. **Yellow-bellied Flycatcher.** *Empidonax flaviventris* (Baird and Baird).— One seen on July 14 and another on July 15 at Trutch; one on July 20 and two on July 21 at the McDonald Creek camp, Mile 114 N. (two collected). Though recorded from Atlin, this appears to be the first record for northeast British Columbia. Cowan (op. cit.) did not find it on the Peace River.

59. **Alder Flycatcher.** *Empidonax trailli trailli* (Audubon).— The characteristic sneezing call of this species was heard several times in the alder and aspen regrowth near the Minaker River at Trutch, Mile 157 J., on July 17; on August 22 I shot one in the edge of a beaver meadow at the Lower Liard Crossing.

60. **Least Flycatcher.** *Empidonax minimus* (Baird and Baird).—Two seen and heard at Trutch on July 13, and several at Fort Nelson relay station on July 18.

61. **Richardson's Pewee.** *Myiochanes richardsoni richardsoni* (Swainson).— Fairly common in the edge of a recent spruce burn, and in the scattered spruces of old alluvial fans at Muncho Lake, July 24-30, where they were calling persistently. Not seen elsewhere. (specimens).

62. **Olive-sided Flycatcher.** *Nuttallornis mesoleucus* (Lichtenstein).— Heard calling in an extensive burn at Trutch on July 17: several heard and one collected at Muncho Lake, July 25-29; one seen at the Liard Crossing August 10.

63. **Pallid Horned Lark.** *Otocoris alpestris arcticola* Oberholser.— Encountered but once, on September 1, when after a light snowfall a flock of some 30 birds was found on the alpine grassland above Summit Pass. Three of them were collected.

64. **Violet-green Swallow.** *Tachycineta thalassina lepida* Mearns.— On July 24 Dr. Williams saw about 12 of these birds in a rocky canyon near Muncho Lake, and the next day I saw two in the same place, and collected one.

65. **Tree Swallow.** *Iridoprocne bicolor* (Vieillot).— Between Trutch and Muskwa River on July 17 I saw two lone birds flying about through burned timber. About July 13 Dr. Williams saw a party of about 10 birds, probably this species, moving slowly eastward across Summit Lake.

66. **Bank Swallow.** *Riparia riparia riparia* (Linnaeus).— At the Lower Liard Crossing on August 4, a band of six to eight of these birds was seen along the river bank; at Mile 261.5 N. in a high sand bank above the road and the Liard River on August 14 about 8 of these birds were seen flying around a number of their tunnels in the sand bank, and out over the river; at Lower Post on August 17, a number of tunnels, undoubtedly of this species, were seen in the gravel cut banks of the Liard River, though no birds were seen there.

67. **Cliff Swallow.** *Petrochelidon albifrons albifrons* (Rafinesque).— Probably a common nesting bird on the many suitable cliffs in the area, and readily taking to buildings for nesting sites. Just north of the Sikanni Chief River on July 12 about 50 of these birds were flying about a large construction building, and going under the eaves; probably they had changed from nesting on cliffs above the river to nesting under eaves in the two years this building had been here. Dr. Williams saw many cliff swallows flying about the cliffs of Steamboat Mountain in late June; he was unable to see the cliff where they were probably nesting. At Lower Post on August 16 and 17, five nests, (1 badly broken, 1 slightly broken, and 3 occupied by well grown young) were seen under the gable end of a cabin, and about a dozen birds were flying about.

68. **Canada Jay.** *Perisoreus canadensis canadensis* (Linnaeus).— A common bird in all the coniferous and mixed-wooded country investigated, except the old poplar-spruce forests along the Liard River where it was rare. The species was recorded from Trutch to Lower Post.

Family parties were usually of three birds, rarely including more than one young. This suggests some controlling factor. In mid-July the young were just beginning to moult

into adult plumage. Not until mid-September were parties of 6 to 8 birds seen.

Canada Jays came to garbage dumps to feed along with ravens and bears, and also commonly came into our camp for food.

They are said to be a nuisance to trappers by getting into traps set for fur bearers; I found they bothered traps set for small mammals sometimes robbing the traps, and sometimes getting caught themselves.

Six specimens were collected as follows: Steamboat Mountain, 2, September 9; Summit Pass, 1, September 6; McDonald Creek, 1, July 20; Muncho Lake, 1, July 28; Irons Creek, 1, August 18. These specimens are intermediate in colour between the pale Alberta birds (*albescens* Peters) and darker coastal birds of British Columbia (*pacificus* Miller) and are very close to some of the birds from Eastern Canada. They are tentatively referred to *canadensis* pending a revision of the species.

69. **Northern Raven.** *Corvus corax principalis* Ridgway.— A common species from the vicinity of the Muskwa River north to Watson Lake; as many as 15 to 20 came regularly to feed at the garbage dumps of many construction camps. Sometimes they were very wild, in striking contrast to the tameness of the black bears that also fed there; sometimes they were quite tame. South of Muskwa River area ravens were seen only on the plateau north of the Buckinghorse River, where a flock of 7 was seen on September 18. Ravens are said to damage the pelts of furbearers held in traps.

A single specimen was collected at Muncho Lake, July 25.

70. **Black-capped Chickadee.** *Penthestes atricapillus atricapillus* (Linnaeus).— Not uncommon in the poplar forest about the Lower Liard Crossing in August, and fairly common in the deciduous second growth about Steamboat Mountain and Muskwa River in September.

Three specimens were collected as follows: Steamboat Mountain, 1, September 15; Lower Liard Crossing, 1, August 22; and Irons Creek, 1, August 10. Though these average slightly more white in the wing, and slightly longer tail than do eastern birds, I am following Taverner (1940, Auk, 57, pp. 536-541) in referring them to *atricapillus*.

71. **Columbian Brown-headed Chickadee.** *Penthestes hudsonicus columbianus* (Rhoads).— A common bird of coniferous and mixed wooded areas; recorded from Trutch to Irons Creek.

Specimens collected as follows: Summit Pass, 1, September 6; Muncho Lake, 2, July 31; Lower Liard Crossing, 2, August 6, 22; Irons Creek, 1, August 10, are plainly this form.

72. **Red-breasted Nuthatch.** *Sitta canadensis* Linnaeus.— Fairly common in spruce forests, or mixed forests containing larger spruces; recorded at Trutch, Muncho Lake, Lower Liard Crossing, near Irons Creek, and at Steamboat Mountain.

A male and a female were collected at Steamboat Mountain on September 11.

73. **American Dipper.** *Cinclus mexicanus unicolor* Bonaparte.— Dr. Williams saw one on the Tetsa River, near Mile 98 in late June, and Dr. Holland, in early July, saw several about the canyon of the Sikanni Chief River some ten miles above the road.

74. **Eastern Robin.** *Turdus migratorius migratorius* Linnaeus.— Occasionally seen and apparently a summer resident from Dawson Creek to Irons Creek, July 11 to August 18; in migration common in flocks at timber line in Muncho Pass and Summit Pass, August 26 to September 8; a number seen near Steamboat Mountain September 9-11; very common in the second growth about Fort Nelson settlement on September 16 when several hundreds were seen.

A male was collected near Steamboat Mountain on September 9.

75. **Northern Varied Thrush.** *Ixoreus naevius meruloides* (Swainson).— Apparently a not uncommon bird of the heavier poplar forests about the Lower Liard River Crossing where it breeds. Young, barely full fledged and still accompanied by their parents were found there August 5, and a female and an immature were collected. The bird was well known to the local trapper, Mould. Two birds were seen in migration near Steamboat Mountain on September 9.

The specimens are referable to this race on the basis of their more ashy, less brownish upper parts.

76. **Hermit Thrush.** *Hylocichla guttata* subsp.?— Fairly common, in full song, at Trutch, July 13-17.

No specimens were secured. Cowan (*op. cit.*, p. 44) refers the breeding birds of the Peace River Area to the eastern hermit thrush (*faxoni*), while Swarth (*op. cit.*, p. 51) refers the breeding birds of the Atlin area to the Alaska hermit thrush (*guttata*), though he records *faxoni* there as a migrant.

77. **Olive-backed Thrush.** *Hylocichla ustulata swainsoni* (Tschudi). Fairly common and apparently a summer resident on the McDonald Creek, July 19-23 and still singing; recorded at Muncho Lake, July 23-August 4, and Lower Liard Crossing, August 4-14.

Three specimens were collected on the McDonald Creek, July 20, 21, and one at Lower Liard River Crossing, August 23. They are slightly greyer, less brownish olive above than are eastern specimens, suggesting that foxing may have taken place in the older, eastern specimens.

78. **Mountain Bluebird.** *Sialia currucoides* (Bechstein).— Only seen twice; an adult and two young in open spruce forest on an old alluvial fan at Muncho Lake on July 28, and Dr. Williams saw two in the mountains above Summit Pass on September 7.

79. **Townsend Solitaire.** *Myadestes townsendi* (Audubon).— A fairly common bird at higher altitudes, at timber line and along the rocky alluvial fans, in Summit Pass August 28 to September 8; Muncho Pass, August 24 to 28; and Muncho Lake, July 23 to August 4. Three, evidently in migration, were seen in burned over country near Steamboat Mountain September 11, and one in an old burn in Smith Valley, August 12.

Two specimens were collected at Muncho Lake and Muncho Pass, July 28 and August 26.

80. **Eastern Golden-Crowned Kinglet.** *Regulus satrapa satrapa* Lichtenstein.—Only one seen, in fall migration, in Summit Pass on September 5, when a female in fresh plumage was taken. This specimen agrees well with eastern Canadian specimens. Cowan (*op. cit.*) also recorded this race from the Peace River, though Swarth, (*op. cit.*) recorded *olivaceus* from the Atlin area, and in the National Museum collections are six specimens from Lac la Nonne, Alberta, and three from Jasper, Alberta, that are referable to *olivaceus*.

81. **Eastern Ruby-Crowned Kinglet.** *Regulus calendula calendula* (Linnaeus). — Recorded occasionally from Trutch (where it was still singing July 14) to near Irons Creek July 13 to August 27. Later, in migration, the species became common at Summit Pass, Steamboat Mountain, and the Muskwa River area from September 2 to 17. Migrants in September were often heard to give part of their song.

Specimens were taken as follows: Steamboat Mt., 1, September 9; Muncho Pass, 1, August 26; Muncho Lake, 3, July 31; Lower Liard River Crossing, 1, August 10.

82. **American Pipit.** *Anthus spinoletta rubescens.* (Tunstell). —Fall migrants were found above timber line in Summit Pass, August 31 (several birds), September 1 (40 birds); and along the roads about Steamboat Mountain September 9, (several), and September 10 (about 20). At Pouce Coupe on September 20, a flock of 25 or so of these birds was in the field near the railroad station.

Two specimens were collected, one at Summit Pass, August 31, and one near Steamboat Mountain, September 9.

83. **Bohemian Waxwing.** *Bombycilla garrula pallidiceps* Reichenow.— Apparently of erratic distribution, and flocking even during the breeding season; recorded as follows: Trutch, one on July 17; Muncho Lake, a flock of 6 on July 25; Lower Liard River Crossing, one on August 10 and another on August 13; and Muncho Pass a flock of 10 on August 27.

84. **Northern Shrike.** *Lanius borealis* subsp.?— Not seen, but Mr. French, British Columbia Forestry Ranger, saw one on the McDonald Creek about 6 miles above Mile 107, on September 8.

85. **Red-Eyed Vireo.** *Vireo olivaceus olivaceus* (Linnaeus).— Fairly common and in song at Trutch July 13-15; at Nelson Relay Station in the poplar forests July 18; and in the poplar forest about the Lower Liard Crossing, August 4-14 and August 20-24. This appears to be about the northwest limit of the range of the species.

86. **Warbling Vireo.** *Vireo gilvus swainsoni* Baird.— Three of these birds were seen and heard singing in young poplar forest at Trutch, July 14-17; and one was collected at the Lower Liard Crossing on August 22.

87. **Tennessee Warbler.** *Vermivora peregrina* (Wilson). — Fairly common in the willow thickets along tributaries of the McDonald Creek near Mile 114N., July 19-23; and occasionally seen in similar situations about the head of Muncho Lake, July 23-August 4. Only one specimen was seen at the Lower Liard Crossing on August 21.

Specimens were taken as follows: McDonald Creek, 3, July 20-21; Lower Liard Crossing, 1, August 21.

88. **Eastern Orange-Crowned Warbler.** *Vermivora celata celata* (Say).— Only found as a fall transient, when one was taken at the Lower Liard Crossing on August 22 and two in Summit Pass on September 2. These specimens compare well with specimens from Manitoba. Cowan (*op. cit.* p. 48), recorded this form as nesting in the Peace River area; Swarth, (*op. cit.*, p. 52), records *orestera* as the breeding bird in the Atlin area, with *celata* as a fall migrant.

89. **Northern Yellow Warbler.** *Dendroica aestiva amnicola* Batchelder.— Recorded as follows: Muncho Lake, one on August 26 (Dr. Williams); one on August 28; Lower Liard Crossing, August 10, one; August 21, one and August 22, several.

A female, collected at the Lower Liard Crossing, August 21, compares better with specimens from eastern Canada referred to this form than it does with brighter coloured prairie birds. (See Oberholser, 1938, *Birds of Louisiana*, p. 530).

90. **Magnolia Warbler.** *Dendroica magnolia* (Wilson).— A beautiful male seen at Trutch July 17, and one bird seen at the Liard Crossing on August 8 and 9. This apears to be about the northwestern limit of the range of the species.

91. **Myrtle Warbler.** *Dendroica coronata* (Linnaeus).— The common warbler, and one of the few common widespread birds of the area; recorded from Trutch to Irons Creek, July 13 to September 16. After the first of August, only immature birds were seen.

Six specimens were collected as follows: Muncho Lake, 3, July 28, 31; Lower Liard Crossing, 1, August 22; Irons Creek, 2, August 18.

92. **Bay-breasted Warbler.** *Dendroica castanea* (Wilson).— From the mixed flock of migratory birds at the Lower Liard Crossing two specimens of this species were taken, on August 10 and 22. This is the third time specimens of this species have been collected in British Columbia.

93. **Black-poll Warbler.** *Dendroica striata* (Forster).— At Trutch, July 13-17, this was fairly common and apparently breeding in the spruce second growth country; it was scarce on the McDonald Creek at Mile 114, July 19-23 where one was taken; several in immature plumage were seen at the Lower Liard Crossing August 9, 10; and one was taken in Muncho Pass, August 26.

94. **Western Palm Warbler.** *Dendroica palmarum palmarum* (Gmelin).— One of the common Warblers of the open second growth country at Trutch July 13-17, where adults were apparently feeding young. Not seen again until September 16, near Muskwa at Mile 152 J., when two migrants were encountered and one collected. This is a notable westward extension of range, and the first record of the species for British Columbia.

95. **Ovenbird.** *Seiurus aurocapillus* (Linnaeus).— Probably a common breeding bird in the poplar forests about the Muskwa; an adult accompanied by well grown young was seen near Mile 0 N., on July 18.

96. **MacGillivray's Warbler.** *Oporornis tolmiei* (Townsend).— Recorded only near the Lower Liard Crossing Mile 213 N., as follows: August 6, one collected; August 21, 22, several seen and one specimen taken. These last were certainly migrants. This is the most northerly record of the species.

97. **Western Maryland Yellow-throat.** *Geothlypis trichas occidentalis* Brewster.— Heard singing in the shrubbery along the swampy flat of the Minaker River July 17, and one specimen taken at the Lower Liard Crossing Mile 213 N., on August 21.

98. **Northern Black-capped** or **Pileolated Warbler.** *Wilsonia pusilla pileolata* (Pallas).— Only found in fall migration; several seen on August 21 at Lower Liard Crossing, and between September 1 to 3 five to twenty birds seen daily in Summit Pass.

Three specimens were collected, one in Summit Pass on September 2, and two at the Lower Liard Crossing, August 21.

99. **American Redstart.** *Setophaga ruticilla* (Linnaeus).— A female plumaged bird seen at Trutch, July 14.

100. **English or House Sparrow.** *Passer domesticus domesticus* (Linnaeus).— Common in Dawson Creek in July and September; on September 16 in the Fort Nelson settlement a flock of about a dozen of these birds was seen about the buildings, and later in a brush pile on the edge of a garden.

101. **Rusty Blackbird.** *Euphagus carolinus* (Muller).— Seen only in migration; one taken in Muncho Pass August 25; from one to twenty-five birds seen daily between September 1 and 8 in Summit Pass; and three birds seen near Muskwa at Mile 251 J., on September 17.

102. **Pine Grosbeak.** *Pinicola enucleator* subsp.?— Dr. Williams saw one at the Lower Liard Crossing on August 7.

103. **Northern Pine Siskin.** *Spinus pinus pinus* (Wilson).— A party of 5 or 6 seen July 12 at Blueberry Relay Station, Mile 53 J; common, in flocks numbering up to 30, about the Lower Liard Crossing, August 4-14 and 20-24; and a few more seen near Steamboat Mountain, September 14.

104. **White-winged Crossbill.** *Loxia leucoptera* Gmelin.— A party of eight was seen on September 17 near Muskwa at Mile 152 J.

105. **Savanna Sparrow.** *Passerculus sandwichensis anthinus* Bonaparte.— On August 16 at Watson Lake about five of these birds were seen about the edge of the airport and lake shore; in migration they appeared in Summit Pass on August 30, when two were seen, and became common on September 1, along with white-crowned sparrows. By the end of our stay there, September 8, they were scarce, most of them having passed through by September 4.

Five specimens, all referable to this form, were collected in Summit Pass, August 30-September 8. Cowan (op. cit., p. 57) refers breeding birds from the Peace River area to *nevadensis*.

106. **Eastern Junco.** *Junco hyemalis hyemalis* (Linnaeus).— A common, widespread species, recorded from all stations visited, in bush areas, and edges of forest. Adults were seen feeding young as late as July 22 on McDonald Creek.

Ten specimens were collected at Summit Lake, McDonald Creek, Muncho Pass and Muncho Lake. These specimens are indistinguishable from comparable birds from eastern Canada.

107. **Western Tree Sparrow.** *Spizella arborea ochracea* Brewster.— Only seen in fall migration, when on September 6 and 7 a few were seen and four collected in Summit Pass; and a few were seen and one collected near Muskwa Mile 251 J., on September 17.

These specimens are very much paler and greyer than eastern birds. Cowan (*op. cit.*, p. 59) quotes Williams, record of an eastern tree sparrow for the Peace River area, but in view of the known ranges of the forms, the specimens should be re-examined.

108. **Eastern Chipping Sparrow.** *Spizella passerina passerina* (Bechstein).— A common species from Trutch (July 13) to Watson Lake August 16. After that only three records; two at Irons Creek, August 19, one in Summit Pass on August 2, and another August 7. A nest containing young was found July 24 at Muncho Lake, and young just out of the nest were seen near the Lower Liard Crossing on August 9. An adult was collected at the Lower Liard Crossing, August 10, and an immature in Summit Pass September 2.

109. **Gambel's White-crowned Sparrow.** *Zonotrichia leucophrys gambeli* (Nuttall).— Not seen until the fall migration; on August 25 a flock of 6 was seen in Muncho Pass; in Summit Pass, on September 1 following a snowstorm, these birds became abundant, swarming everywhere. On the following days they gradually decreased in numbers until on September 8, the day I left Summit Pass, only a few were to be found.

Specimens were taken as follows: 5 adults and 1 immature, September 2 to 7, Summit Pass; 1 adult and 2 immatures, August 25 to 27, Muncho Pass. They are typical of this form.

110. **Golden-crowned Sparrow.** *Zonotrichia coronata* (Pellas).— Probably a not uncommon breeder at timberline from Summit Pass to Muncho Lake; recorded as follows: August 28, five adults seen above Muncho Lake;

August 30 one seen in Summit Pass and another on September 1.

Specimens were taken as follows: Summit Pass, 1, August 30; Muncho Lake, 2, July 28.

111. **White-throated Sparrow.** *Zonotrichia albicollis* (Gmelin).— Heard singing at Blueberry Relay Station July 12, and at Trutch, July 17; one specimen, an immature female, collected at the Lower Liard Crossing July 22. This is on the northwestern edge of its known range.

112. **Eastern Fox Sparrow.** *Passerella iliaca iliaca* (Merrem).— Only seen once, when two appeared in Summit Pass on September 1, in fall migration; one was collected.

113. **Lincoln's Sparrow.** *Passerella lincolni lincolni* (Audubon).— Common at Trutch July 13-17, and probably breeding in the marshy shrubbery along the Minaker River; occasionally seen at the Lower Liard Crossing August 4-14, and more commonly evidently migrating, August 20-24; several seen near Lower Post, August 16; a few in Muncho Pass August 24-28; and fairly common in Summit Pass, in migration September 1-8 when up to 25 birds were seen in a day.

Specimens were collected as follows: Summit Pass, 1, September 1; Muncho Pass, 1, August 26; Lower Liard Crossing, 3, August 5-22.

114. **Alaska Lapland Longspur.** *Calcarius lapponicus alascensis* Ridgway. — Only seen in fall migration, above timberline in Summit Pass. On August 30 a few birds were found but with the change in the weather on September 1 that corresponded with the arrival of immense numbers of certain other birds, several flocks of hundreds of longspurs were seen, and these birds were seen in less numbers until I left the area, on September 8.

Seven specimens were collected in Summit Pass, August 30 to September 7.

BOOK REVIEWS

FRUITS OF THE EARTH. *By Jannette May Lucas. Illustrations by Helene Carter. 71 pp.; 4 coloured maps; illustrations in colour and black and white; 1942. J. B. Lippincott Company, Philadelphia. In Canada Longmans Green & Co., Toronto. Price $2.50.*

This is an attractive volume describing the origin of many of our cultivated fruits. It is evidently intended for young adult readers but will be of interest to many gardeners and to botanists concerned with the history of cultivated plants and their development from wild species. The work is definitely non-technical but presents much of the mythology, legend, history, and early spread of our common fruits. Four main groups of fruits, namely stone fruits, core fruits, berries, and citrus fruits are discussed. The botany of fruits and their improvement through cultivation and breeding are also described in simple language. The author is a daughter of a former Director of the American Museum of Natural History. The illustrator is a former Canadian from Toronto. She has prepared colourful maps showing the spread of many of the fruits discussed, as well as sketches in black and white or in colour of the flowers and fruits of most of these species. — HAROLD A. SENN.

THE SEASHORE PARADE. *By Muriel Lewin Guberlet. Coloured illustrations and pen sketches by Jan Ogden. The Jaques Cattell Press, Lancaster, Pa., July 11, 1942. pp. 197. Price U.S. $1.75*

Primarily intended for young readers, but of much interest for older ones too, this is a popular volume which might serve as an elementary introduction to the abundant animal life of the seashore. The language is relatively simple and the text very readable. The procession starts with the plankton and deals in turn with most of the invertebrate animals which are to be found along a salt-water shore.

The coloured illustrations are done in the modern manner with bold contrasts and brilliant colours. The text deals briefly with habitats, food habits, natural enemies, reproduction, and other phases of the biology of the animal concerned. This work is in no sense a text-book and cannot be used for purposes of identification but it might serve as excellent supplementary reading for classes in elementary secondary school biology. Certainly it will be read avidly by anyone who loves to wander along the seashore, interested in the abundant life around him. — HAROLD A. SENN.

POTAMOGETON CRISPUS L. IN ALBERTA[1, 2]

By HERBERT GROH

Division of Botany, Department of Agriculture, Ottawa

RECEIPT of specimens of curly muckweed or crisp pondweed (*Potamogeton crispus* L.), collected by Dr. G. H. Turner, Fort Saskatchewan, Alta., at Calgary, Alta., on Sept. 16, 1943, provides a notable extension of known range northwestward.

The type locality of this species is given as Europe. According to Tehon (*Torreya* 29: 42-46. 1929), "With the exception of the two Americas, it is of nearly world-wide distribution.....". The oldest dated American specimen is believed to be one from Philadelphia, 1841-2. (Bennett, Arthur, *Jour. Bot.* 39: 201. 1901). Introduction was probably from Europe, and Tehon (*loc. cit.*) offers the suggestion that it may have been brought, not by the hand of man, but by "such birds as the European Widgeon, which has been caught straying on this continent more than eighty times". Also, "Its subsequent spread westward might be attributed to a variety of agencies, but it seems to me most likely that aquatic birds have been the most important"; and he correlates records of the pondweed with migration routes of ducks. McAtee (*U.S. Dept. Agr. Biol. Survey, Bull.* 81. 1911) reported pondweeds to be an important part of the food of ducks.

The general range of the plant is from the Atlantic States to Lake Ontario, where it was collected by Wm. Scott on Ashbridge's Bay, Toronto, as early as June, 1896. In July of the same year it was collected by D. Griffiths far to the west in South Dakota. In 1901 it was found by Prof. Macoun above Niagara Falls, and in the same year also in east-central Oregon. Abrams (*Illustrated Flora of the Pacific States*) attributed it to southern California. The specimen from Calgary is the most significant later extension of range to come to the notice of the Division.

Canadian specimens in the National Herbarium (Can) and the Division of Botany (DAO) may be cited as follows:

ONTARIO: Ashbridge's Bay, Toronto, June 19, 1896, *Scott* (Can., DAO); pool above Niagara Falls, July 16, 1901, *Macoun* (Can); Rideau River at Jones' Falls, 1905, *Fletcher* (DAO). ALBERTA: Calgary, in 2 feet of water, on left bank of Elbow River, ¼ mile above Mission Bridge (and extending for a mile), Sept. 16, 1943, *Turner 3675* (DAO). In Quebec according to Marie-Victorin it is known only on the Richelieu River, where it was collected near Ste. Therese Island by Marcel Raymond (*Can. Field-Nat.* 48: 138. 1934).

In 1913 *P. crispus* was reported abundant in the lagoons of Jackson Park, Chicago, Ill., so much so that "much work is needed to keep it cleaned out in the spring, when its growth is most vigorous." (Hull, Edwin D., *Rhodora* 15: 171. 1913). Dr. Turner in reporting the Calgary occurrence suggests that "it has possibilities of becoming a serious weed of irrigation ditches." Common floating pondweed (*P. natans* L.), and other species, frequently clog slow streams and the shallow water of beaches right across the continent. Ducks foraging in beds of such vegetation frequently become carriers of fragments capable of continuing their growth when dropped in other waters at not too great a distance. Instances are given (Ridley, H. N., *The Dispersal of Plants Throughout the World*, page 539. 1930) in which, among others cited, is this by an English observer: "I have often seen ducks carrying fragments of water plants on their backs or around their necks. Twice, when shot in flight, the pieces have turned out to be *Elodea canadensis*, once another pondweed, *Potamogeton crispus*". Dispersal in this way to Calgary from any distant station is not suggested, but the probability of numerous infestations in little botanized waters between, along migration routes, will bear investigation. Long distance carriage of seeds of the pondweed will also suggest itself, but evidence of this has not been found. Seeds, unless of the previous year, would not be available to the birds at the time of migration from the Atlantic coast northwestward.

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EDGAR MELVILLE SERLE DALE — — 1883 - 1943

By JOHN DEARNESS
London, Ontario

IN SCIENTIFIC CIRCLES the subject of this brief sketch was internationally known as an observant student and reliable reporter of the events of bird life, and locally almost equally well known for his community interests and his skill as a floriculturist. As an ornithologist his authority was hardly surpassed by that of his relative, the late Dr. W. E. Saunders, both of whom were born and lived all their lives in London, Ontario. Their friendship was as close as their kinship; although their vocations were different they collaborated closely in their avocational pursuits, each owing much to the other. One wrote the obituary* of the other, and survived him but a few weeks.

Their ancestral home was in Devonshire, England. Melville Dale counted his birthdays from the 19th of November, 1883. He was the son of Andrew Dale, sometime Division Court Clerk and later London City Auditor, and Elizabeth Burgess. He received his education in the London public and high schools. Shortly before the completion of his high school course a request came to the head master from the wholesale firm of Robinson, Little & Co. for assistance in the selection of a competent trustworthy youth to be trained for accountancy in their office. The choice fell upon Dale; and thus began a mutually satisfactory engagement that lasted until the firm went out of business, - a period of 30 years. In the 23rd year of his age he completed, better to say he began, another important, if possibly happier, engagement that lasted for life, by marrying Miss Ethel G. Holcombe, now his survivor.

It may be inferred from the records that as a boy he was interested in birds. He comes into the Minutes of the McIlwraith Ornithological Club by response to an invitation to read a paper on his observations of birds he had studied. This paper was so well received that the Club ordered that it be offered for publication in the Ottawa Naturalist, as this Journal was then called. From that beginning until the occurrence of his fatal illness he seldom if ever missed a meeting. In this connection Mrs. Dale's name should be mentioned. The writer can say of the addresses he has heard in these meetings, among the best remembered was one given by her. During the holidays they made long-distance trips in Canada and the States; their reports of which became a feature of the first meetings after their return.

Mr. Dale seemed to be the official chronicler of bird migrations and unusual events. At every meeting he was expected to report noteworthy ornithological matters. He knew birds by their flight, their form, their note, their nest, their eggs. As an example of faithful recording the reader is referred to the ninety page "History and List of the Birds of Middlesex County" by Saunders and Dale.

He shared and continued his father's interest in philately. In postage stamps he saw more than color and size; to him they carried connotations of politics, history and art. "Birds on Postage Stamps" was the title of one of his lectures. In it he put over forty uncancelled or nearly clean stamps, each bearing a bird picture, in the projecting lantern and showed how interesting some postage stamps may become to a person who studies their implications.

In botany he knew the pleasure of tracing a strange plant to its name and description in a manual. I never saw him taking a gun to the woods; he usually put a short-handled spade and bag in the car, that in case of noticing an interesting wild plant he could successfully remove it to his garden. Perhaps his keenest pleasure was derived from his flower garden. For the rarity and beauty of flowering plants that skilful cultivation can carry through the winter out of doors, his garden was almost the perfect demonstration.

It seemed to be his nature to avoid publicity, but he never shirked a duty. Such organizations as the Y.M.C.A., could depend on his help. For many years he was trustee and treasurer of the oldest Baptist congregation in the city. By precept and example he was a missionary of resistance to liquor and tobacco addiction. His influence will long be a beneficent memory to all who came within its sphere.

* —William Edwin Saunders, **The Canadian Field-Naturalist**, September, Vol. 57, No. 6: 99, 1943. By E. M. S. Dale.

THE SMELT SITUATION IN THE UPPER GREAT LAKES, ONTARIO, MAY 1943[1]

By J. C. STEVENSON
Pacific Biological Station, Nanaimo, B.C.

FOR SEVERAL YEARS large spawning runs of smelts (*Osmerus mordax*) have taken place each spring in the streams along the north shore of the North Channel and the Georgian Bay areas of Lake Huron. The first run to be observed in Lake Superior took place some years later than the initial run in Lake Huron. Up until 1943 the annual runs in Lake Superior were much less pronounced than those of the North Channel.

Normally the North Channel spawning began between April 8 and April 20, and lasted about ten days. At the height of the run incredibly large numbers of smelts entered the streams in the evening to spawn. They were so numerous at times that they could be shovelled from the streams. The greatest numbers were usually observed between 10 p.m. and midnight, but on occasions many smelts were seen in the creeks throughout the day.

During the spring of 1943 the run was greatly reduced, and, in many streams where large runs had occurred in previous years, the smelts were absent entirely. The writer was in the Ontario Sault Ste. Marie area during the first ten days of May, 1943, investigating the spawning conditions in about forty streams flowing into the North Channel and into the eastern end of Lake Superior. Most of these streams were visited personally by the writer and the conditions in the remaining streams were reported by reliable persons.

The spring was unusually late. Ice remained in the creeks and bays from two to four weeks longer than in previous years. The first report of observing smelts came from a Sault Ste. Marie into Georgian Bay. It has been reported a small number in a creek flowing into Lake Superior about fifteen miles from Sault Ste. Marie on April 26. In the last week of April two streams, situated between twenty and thirty miles from Sault Ste. Marie and flowing into Lake Superior, were stated to have had moderate runs for about two nights. With the exception of these two streams the smelt run was practically negligible in the Upper Great Lakes.

On two occasions the writer visited Nestorville Creek (fifty miles east of Sault Ste. Marie) and found no smelts. As far as could be ascertained no smelts whatever were caught in this creek during the spring of 1943. In past years large quantities were taken there. At Thessalon, five miles east of Nestorville, about fifty smelts were taken from the Thessalon River on the evening of May 6. Many people made attempts to net them that evening, a few spending as long as four hours. Probably about the same number was obtained the previous night, but none was caught on any other occasion as far as the writer was able to learn. Up to May 10 no run was reported from Lauzon Creek at Algoma Mills.

The extreme lateness of the spring was not likely an important factor in decreasing the spawning run. According to H.H. MacKay of the Ontario Department of Game and Fisheries, some excellent runs have been found to take place in late springs when the creeks were partially covered by ice.

The abnormal situation appeared to have been the direct result of a widespread mortality which swept the smelt population the previous fall. In the latter part of October, 1942, tremendous numbers of dead smelts were seen floating on the water in the North Channel -- a "solid white sea of dead smelts". They were so thick in the water that the speed of fishing boats was reduced due to their interference with the motor propellers. Eventually they were washed on shore. Many reports make it safe to state that on parts of the north shore of Manitoulin Island dead smelts were piled to a depth of at least one and one half feet. The mortality extended from Sault Ste Marie into Georgian Bay. It has been reported also on the Michigan shore of Lake Huron.

1. —Received for publication February 11, 1944.

Commercial fishermen at Thessalon reported that during the winter of 1942-1943 very few smelts were caught in their nets as compared with previous winters. It seems reasonable to believe that this marked diminution in the population was the chief factor in reducing the spawning run.

Study of the sex ratio of the small number of smelts that ascended the streams showed a considerably larger proportion of males than females. Of sixteen smelts examined from Jones' Creek on May 2 only two were females (Jones' Creek flows into Lake Superior about forty miles from Sault Ste. Marie). The sex ratio of the smelts caught in the Thessalon River on May 6 was ten males to one female. The males averaged 5.5 inches in length, and the females were slightly smaller being about 5.25 inches long.

BOOK REVIEW

A GUIDE TO BIRD WATCHING. *By J. J. Hickey, with illustrations by Francis Lee Jaques and Bird Tracks by Charles A. Urner, 8vo., XIV + 262 pps., Oxford University Press, London, New York and Toronto, Price $4.50.*

This is a book of ideas. Much bird study has been only the listing of birds seen. Mr. Hickey shows how details of bird life can be gathered and woven into a pattern that has meaning. Studies of this sort will give the student keener pleasure, and his work greater worth.

The author begins with the basic need of identification, and how to go about it, and then goes on to discuss special phases of birds' actions and needs. Studies such as those of migration, censuses, ecological studies, those involving bird banding and many others are taken up, and it is shown how co-operative studies can be conducted. Hints are given on bibliographic work and on publication.

Emphasis is properly placed on the study of more common birds. With more material available, the results of a study are more likely to be worth while. Numerous model studies, chiefly from the northern and eastern states, are given.

In several appendices are given data on bird-tracks, how to record them and a key for identifying them; some results of a breeding-bird census; an outline of a life history study; a list of bird books, and a list of bird clubs in the United States and Canada.

The book is written in an easy, informal style, enlivened with personal anecdotes. The black and white decorations by Jaques are attractive decorations.

A few criticisms should be given. A popular style has its pitfalls. Such statements as birds "occupy three-dimensioned territories" does not convey the idea intended. On some controversial subjects the evidence is not well balanced. That "the phenomenon of rhythmically changing numbers has consistently escaped the notice of ornithologists" is untrue. Though identifying bird tracks is an interesting hobby, use of such identifications in establishing records is fraught with danger. Only one of the several available provincial lists of Canadian birds is given.

As a thought provoking volume this is heartily recommended as a valuable supplement to the bird student's library.

A. L. RAND.

NEWS OF NATURALISTS

Professor H. B. Hitchcock, who recently removed from the University of Western Ontario to Middlebury College, Vermont, is continuing his studies of Canadian bats.

The latter part of February he explored for new caves in the Montreal area, and spent a day checking the hibernating bat population of a cave near Renfrew, Ontario. A considerable number of bats, banded in earlier years in the same cave, were found, and additional bats were banded for the first time. So far there have been no summer returns of winter banded bats.

VASCULAR PLANTS COLLECTED ON KISKA AND GREAT SITKIN ISLANDS IN THE ALEUTIANS BY LT. H. R. McCARTHY AND CPL. N. KELLAS, AUGUST, SEPTEMBER AND OCTOBER, 1943.[1]

By A. E. PORSILD
National Museum of Canada, Ottawa.

MOST OF THE 59 numbers in the collection are from Kiska island of the Rat group, in Lat. 52°N. and 177° 33′ E. Long., while the rest came from the Great Sitkin island of the Andreanof group in Lat. 52° N., and 176° W. Long.

As far as the writer is aware no previous collections of plants are known from Great Sitkin; on the other hand the flora of Atka, the largest island of the Andreanof group, is fairly well known. Several small collections have been made on Kiska. (See E. Hultén: Flora of the Aleutian Islands, Stockholm, 1937).

The collection was made very late in the season and many of the specimens are sterile or even mere fragments. It is interesting, nevertheless, because it adds several species not previously known from Kiska or from the Rat group, besides three species that have not before been collected in the Aleutian Islands.

Two not quite identical sets of specimens have been examined; the better set is in the Herbarium of the Provincial Museum, Victoria, B. C., the other is in the National Herbarium of Canada. In the above list specimens represented in the latter set are marked with an asterisk(*).

* *Lycopodium Selago* L., Kiska, Sept. 26.

* *L. sabinaefolium* Willd. var. *sitchense* (Rupr.) Fernald, Kiska, Sept. 28 and Oct. 21.

* *Calamagrostis nutkaensis* (Presl.) Steud., Kiska, Oct. 4.

Deschampsia caespitosa (L.) Beauv. ssp. *orientalis* Hult., Kiska, Oct. 12.
New to Kiska but previously collected at Amchitka I.

Elymus arenarius L. ssp. *mollis* (Trin.) Rupr., Kiska, Oct. 12.

* *Eriophorum russeolum* Fr., Kiska, Oct. 12.
The presence of this species, in the collection from Kiska, is of particular interest. It is known from both sides of Bering Strait but in the Aleutian chain, according to Hultén, l.c., p. 103 and map No. 101, has not previously been collected west of Unalaska island.
The species is represented by two culms with well developed fruiting heads. In addition to several 2 mm. long anthers, found among the dark reddish bristles, the specimens have the broad scales characteristic of *E. russeolum.*

* *Carex circinata* C. A. Mey., Kiska, Oct. 12.
New to Kiska but previously collected on Amchitka I.

C. macrochaeta C. A. Mey., Great Sitkin.

Juncus Mertensianus Bong., Kiska, Sept. 23.
Not previously known from Kiska or from the Rat group.

* *J. ensifolius* Wikstr., Kiska, Oct. 3.
Not previously known from Kiska or from the Rat group.

Luzula Wahlenbergii Rupr., Great Sitkin.

* *Iris setosa* Pall., Kiska, Sept. 23 and Oct. 3.

Habenaria hyperborea R. Br., Great Sitkin, Aug. 4.

* *Salix crassijulis* Trautv., Kiska, Sept. 23 and 28, and Great Sitkin.

Polygonum viviparum L., Great Sitkin, Aug. 4.

Oxyria digyna (L.) Hill., Great Sitkin, Aug. 4.

Claytonia ? sarmentosa C. A. Mey., Kiska, Sept. 23.
The specimens are without rhizomes and basal leaves. The species has not previously been recorded from the Aleutians, but is known from Pribilof, St. Lawrence, the Diomede Islands and from the Asiatic and American mainland.

* *C. sibirica* L., Kiska, Oct. 3.

* *Honckenya peploides* (L.) Ehrh. ssp. *major* (Hook.) Hult., Kiska, Sept. 23 and Oct.3.

1. —Received for publication May 5, 1944.

* *Coptis trifolia* (L.) Salisb., Kiska, Sept. 26.

Anemone narcissiflora L. var. *villosissima* DC. Great Sitkin.

* *Leptarrhena pyrolifolia* (D. Don.) Ser., Kiska, Oct. 12.

Saxifraga rivularis L., Great Sitkin, Aug. 4.

S. punctata L., ssp. *insularis* Hult., Great Sitkin, Aug. 4.

* *Rubus stellatus* Sm., Kiska, Sept. 26, Oct. 4.

* *Potentilla pulchella* R. Br., Kiska, Oct. 4.
This species, which has not previously been recorded from the Aelutian Islands, is represented in the collection by a single specimen that does not appear to have flowered during the past season. The specimen forms a small and rather compact cushion only a few centimetres high, with three centimetre long leaves, including the petiole.

Our plant resembles *P. Sommerfeldtii* Lehm. but does not have the glabrate upper leaf surfaces said to be characteristic of that species. In the Kiska plant the leaf segments are linear, 2 to 3 millimetres wide and long silky villous on both sides.

* *P. villosa* Pall., Kiska, Sept. 26.

* *Sibbaldia procumbens* L., Kiska, Oct. 12. Not previously collected on Kiska, but known from the nearby Amchitka I.

* *Geum pentapetalum* (L.) Makino, Kiska, Oct. 12. This species is represented by two depauperate, sterile specimens which had grown in *Sphagnum* moss.

Geum calthifolium Menzies, Great Sitkin, Aug. 4.

Lupinus nootkatensis Donn., Kiska, Oct. 12.

Geranium erianthum DC., Kiska, Sept. 26.

* *Empetrum nigrum* L., Kiska, Sept. 26.

* *Viola Langsdorffii* Fisch., Kiska, Sept 24 and Oct. 4 and 12.

* *Epilobium glandulosum* Lehm., Kiska, Oct. 4.

E. Behringianum Hausskn., Kiska, Sept. 23.

E. Bongardi Hausskn., Great Sitkin. (fragmentary specimens)

* *Coelopleurum Gmelini* (DC.) Ledeb., Kiska, Oct. 4 and 12.

Pyrola minor L., Great Sitkin, Aug. 4.

Rhododendron kamtschaticum Pall. ssp. *typicum* Hult., Great Sitkin.

Loiseleuria procumbens (L.) Desv., Kiska, Sept. 26.

Phyllodoce aleution, (Spreng.) Heller, Great Sitkin, Aug. 4.

* *Vaccinium Vitis-idaea* L. ssp. *minus* Lodd., Kiska, Sept. 28.

Primula cuneifolia Ledeb. ssp. *saxifragifolia* (Lehm.) Hult., Great Sitkin, Aug. 4.

* *Mimulus guttatus* DC., Kiska, Sept. 23 and Oct. 4.

Veronica grandiflora Gaertn., Great Sitkin, Aug. 4.

V. Stelleri Pall., Great Sitkin, Aug. 4.

* *Rhinanthus groenlandicus* Chab., Kiska, Sept. 23 and Oct. 3. Not previously recorded from the Rat group.

* *Linnaea borealis* L., Kiska, Sept. 28.

* *Campanula lasiocarpa* Cham., Kiska, Sept. 23 and Oct. 3.

* *Solidago multiradiata* Ait., Oct. 12. The collection consists of a single, sterile rosette. Previously recorded from Attu and Agattu but not with certainty from others of the western Aleutians.

* *Anaphalis margaritacea* (L.) Benth. & Hook. var. *occidentalis* Greene, Kiska, Sept. 23.

* *Achillea borealis* Bong., Kiska, Sept. 23 and Oct. 12. (leaves only)

Chrysanthemum arcticum L., Kiska, Sept. 26.

* *Ch. segetum* L., Kiska, Sept. 26.
This annual, a native of the Mediterranean, when collected had only just reached anthesis. It is undoubtedly a recent introduction and probably will not persist.

Artemisia Richardsoniana Bess., Kiska, Sept. 24. The single specimen is very small and depauperate but is a good match for specimens of that species from the arctic coast of Alaska. It is definitely not *A. borealis*, collected on Kiska by I. W. Hutchinson and reported by Hultén, l.c. p. 342. It is new to the Flora of the Aleutian Islands.

* *Arnica unalaschkensis* Less., Kiska, Sept. 23 and Oct. 4.

* *Senecio pseudoarnica* Less., Kiska, Sept. 21.

Hieracium triste Willd., Great Sitkin, Aug. 4.

THE OCCURRENCE OF STARFISH IN THE LOWER CRETACEOUS OF THE PEACE RIVER VALLEY[1,2]

By F. H. McLEARN

FOSSIL STARFISH are rare in the Cretaceous of North America and rare in the Lower Cretaceous anywhere. Their occurrence therefore in the *Gastroplites* fauna in the Peace River valley is worthy of record. They have been found at two localities, at the mouth of Starfish Creek in the Peace River canyon (see Portage Mountain sheet) and about 200 miles to the east near the mouth of Cadotte river (see Sexsmith-Bison Lake preliminary map).

Starfish Creek enters Peace River canyon from the south, nearly 7 miles above Hudson Hope. Here it has carved a deep, V-shaped valley below a high upland. Not far from the mouth, where it divides, and between the two branches, it has also carved a steep-sided, pointed spur, which has the appearance of a pyramid when viewed from the opposite and north side of the canyon. On both slopes of the Starfish valley and in the adjacent cliffs of the Peace River canyon are good exposures of the Hasler formation. This formation has been defined (Wickenden and Shaw, 1943) as the shales lying between the sandstones of the Goodrich formation above and the sandstones and conglomerates of the Commotion below, in the Mt. Hulcross-Commotion Creek area in the Pine Valley to the south. As the Goodrich is said to extend as far north as the Peace Valley (Beach and Spivak, 1944) the name of Hasler can be used there also. The downward range may be lower, however, as the top of the underlying Gates formation on Peace river is likely lower stratigraphically than the top of the Commotion formation on the Pine river. Indeed the beds exposed at the mouth of the Starfish Creek are low in the Hasler and probably in part equivalent to the upper part of the Commotion.

The best exposures are in the high cliffs, above and below the mouth of the creek. In the lower part of the cliffs are dark shales, and at the top shales and siltstones or very fine sandstones. The *Gastroplites* fauna occurs in these top beds, about 500 feet (Spivak, J., personal communication) above the base of the formation. They are inaccessible in the very steep cliffs but abundant fragments of talus lie along the bank of the river. In these fragments, shells of the *Gastroplites* fauna are found in abundance, including the ammonoid *Gastroplites kingi*, the pelecypod *Inoceramus caddotensis* var. *altifluminus* and the starfish *Lophidiaster silentiensis* and *L.* cf. *silentiensis*.

To the east these beds rise and disappear from the river cliffs, but farther downstream equivalent beds must descend and disappear below river level somewhere between the Gates and the mouth of Cache Creek. East of this and across the plains equivalent beds are far below the surface in the Alberta syncline. They rise again to the surface at the confluence of the Peace and Smoky rivers near the town of Peace River, - as the upper or Cadotte member of the Peace River formation. This member consists of massive, fine sandstone with a coaly layer. It is partly at least of non-marine origin and the marine *Gastroplites* fauna is absent. Farther north, however, near and below the mouth of Cadotte River, the massive sandstone of this member passes over into thin-bedded sandstone and shale and obviously into a marine phase, for it carries the marine *Gastroplites* fauna. Of the fauna collected from these beds the following have been described: several species of the ammonoid genus *Gastroplites*, the pelecypods *Dicranodonta dowlingi*, *Pinna curvimarginata* and *Trigonia albertaensis* and the starfish *Comptonia ? stelcki*.

The upper part of the Commotion formation in the Pine valley is probably of the same age as the *Gastroplites*-bearing beds,

1. —Published with the permission of the Director, Mines and Geology Branch, Department of Mines and Resources, Ottawa.

2. —Received for publication February 15, 1944.

for Wickenden has collected *Inoceramus cadottensis*. No starfish were found, however. *Gastroplites* has been collected on the Liard River (Kindle, 1944), but no starfish have been reported. As the *Gastroplites* is a northern fauna and came in with a boreal sea invasion, it is likely that the *Gastroplites* fauna will be located in other parts of northern Canada, and there is the possibility that additional starfish will be found there.

Gastroplites occurs in the Gault of Folkestone, England (Spath, 1937). It is therefore of Albian and late Lower Cretaceous age.

A preliminary description of three starfish is given below. The generic position of two seems assured, but that of the third is less certain. The type specimens are deposited in the Geological Survey collections at Ottawa.

Lophidiaster silentiensis n. sp.

Plate 1, figure 3

The holotype is a mold of the actinal side of a test of this species and was prepared by etching. The holoplastotype is a cast in lastex of this mold. It is fairly well preserved except that a considerable length of four of the arms is missing. One arm is nearly complete. It is a rather small specimen with a disk of moderate size and fairly long arms. The major radius, that is from the centre of the disk to the distal end of an arm, is 25 mm. The minor radius, that is from the centre of the disk, halfway between two arms, is 8.4 mm.

The arms have approximately straight margins and taper gradually. There are fourteen inferomarginal plates on the longest and best preserved arm. Two plates in the centre of the interradial margin are stout, high and somewhat wedge-shaped. The remainder decrease in size distally and are thick, broad elevated and very convex or arched. The smaller adambulacrals are more numerous than, and not opposite the inferomarginals. The rafter-like ambulacrals are stout and excavated on their proximate sides. They are opposite one another and also opposite the adambulacrals. There are twenty ambulacrals on the longest, preserved arm. The pairs of oral plates are elevated and overhang the border of the mouth. No spine pits can be seen. Due to imperfect preservation of the surface it is difficult to say whether any of the plates are rugose. The somewhat pappilose surface within the mouth may be the under side of the dorsal or abactinal test.

Lophidiaster ornatus Spencer from the early Upper Cretaceous of England has narrower and more slender marginal plates and a somewhat different outline particularly in the interradial area.

Silentia, a latinized form of the Peace country.

The holotype is cat. no. 8995, the holoplastotype, cat. no. 8995a. The holotype was collected on the north bank of the Peace River opposite the mouth of Starfish Creek by F. H. McLearn in 1917.

Lophidiaster cf. *silentiensis*

Plate 1, figure 2.

The abactinal area is preserved. As in the holotype of the foregoing species a mold was prepared by etching and a lastex cast made from the mold.

Compared with the holotype of *Lophidiaster silentiensis* n. sp., it is somewhat larger, the margin in the interradial area is somewhat more broadly rounded and the superomarginals are slightly more narrow and if anything even more arched or ridged than in the holotype of *L. silentiensis*. The superomarginals and inferomarginals in this specimen are opposite. The surface of the arms between the superomarginals is finely pappilose, suggesting an original paxilliform surface. The surface of the disk is not well preserved, but may also have been paxilliform.

The specimen from which cast of figure was taken is cat. no. 8994. The figured cast is cat. no. 8994a. The specimen was collected on the south side of the Peace river, near the mouth of Starfish Creek by C. M. Sternberg in 1930.

Comptonia ? stelcki n. sp.

Plate 1, figure 1

The preservation of the holotype (See plate 1, figure 1) is unusual. The specimen has broken across so as to expose the inner side of the actinal test. Some plates of the disk of the abactinal test however may be mixed with those of the actinal test.

The disk is relatively large and the arms slender, straight-sided and gradually tapering. The major radius is 31 mm. and the minor radius 10.2 mm. The closely set and stout ambulacral ossicles can be seen from the inside of the test, rising steeply like rafters on a roof with small pores between them. They are very distinct on the arms, but not so well

preserved in the disk. In the arms the ambulacral ossicles are bordered by very wide (that is, elongate radially), somewhat thin inferomarginals. They increase in size and relative thickness toward the interradial zone where they are both wide, thick and stout. In the interradial areas between the inferomarginals and the border of the mouth are a number of relatively large plates, forming a pavement of which the pattern is difficult to determine.

The paratype (not illustrated) is a part of the inside of the abactinal test of the same specimen. Two arms and a part of the disk are preserved. In the arms the inside of the high, wide and somewhat thin superomarginals can be seen, the insides of three rows of plates, a median radial row, bordered on either side by a row of small plates elongate radially. On the disk the superomarginal plates are large and thick and there are numerous plates, now somewhat irregularly arranged, which probably covered the abactinal surface.

This species is provisionally referred to the genus *Comptonia* Gray. The arms are more slender than those of *Comptonia elegans* Gray from the Upper Greensand of England, and the marginals are stouter in the interradial areas and more elongate, radially in the arms. As the exterior surface is not known, all comparisons cannot be made. The disk is relatively larger and the marginals more elongate in the arms as compared with *Comptonia wintoni* Adkins from the late Lower Cretaceous Pawpaw formation of Texas. Doubtless other differences exist and even some resemblances, but they are difficult to determine because of the peculiar manner in which the specimens break, that is through the shell and exposing only the interiors of the tests.

The name is given for C. R. Stelck.

The holotype is cat. no. 8992. The paratype is no. 8993. Both types were collected on Peace River, 8 miles below the mouth of Cadotte river by F. H. McLearn in 1917.

REFERENCES

Beach H. H. and Spivak, J. 1944. Dunlevy-Chinaman Lake-Portage Mountain Map areas, B.C. *Geol. Surv. Canada, Paper* 44.

Kindle, E. D., 1944. Reconnaissance along Fort Nelson, Liard and Beaver Rivers, Northeastern B.C., and Yukon Territory, *Geol. Surv. Canada, Paper* 44.

McLearn, F. H. 1918. *Geol. Surv. Canada, Summ. Rept. for 1917C*, pp. 14C to 21C.
1919. *Geol. Surv. Canada, Summ. Rept. for 1918C*, pp. 1C to 7C.
1933. *Trans. Roy. Soc. Canada*, 3rd ser., vol. 26, sec. 4, pp. 157-175.

Wickenden, R. T. D., and Shaw, George, 1943. Stratigraphy and Structure in Mount Hulcross - Commotion Creek Map area, B. C., *Geol. Surv. paper 43 - 13.*

EXPLANATION OF PLATE

Figure 1. *Comptonia? stelcki* n. sp. Inside view of actinal test. Holotype cat. no. 8992.

Figure 2. *Lophidiaster* cf. *silentiensis* n. sp. Abactinal view. Mold of figured cast, cat. no. 8994; figured cast, cat. no. 8994a.

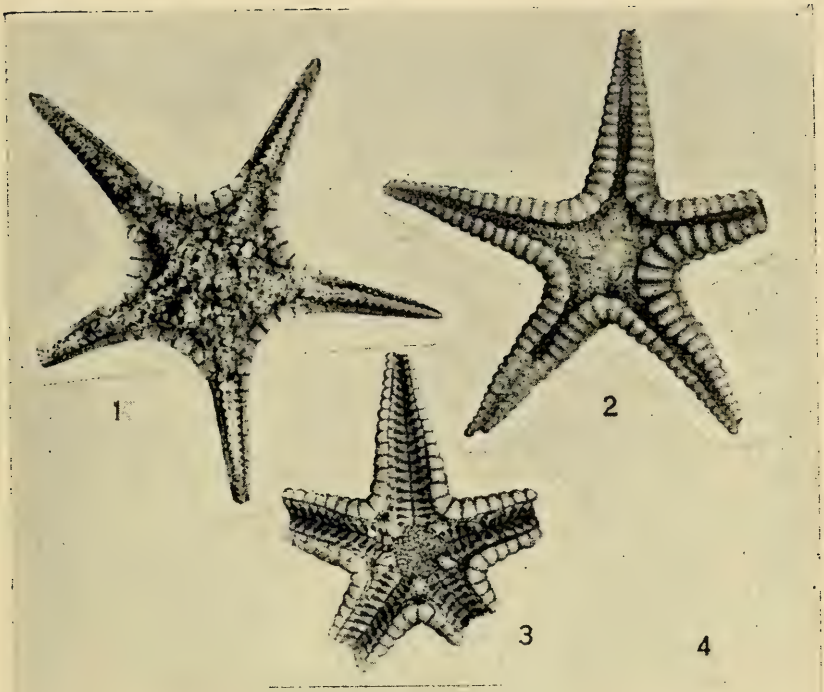
Figure 3. *Lophidiaster silentiensis* n. sp. Actinal view. Holotype cat. no. 8995, holoplastotype cat. no. 8995a.

Figure 4. View of mouth of Starfish Creek.

CURRENT LITERATURE

THE BRODIE CLUB. *Proceedings No. 8 (For 1943).*

An editorial presents a very considerable list of members serving in the armed forces and brief accounts of seventeen meetings held throughout the year. Papers were given on a wide range of subjects in natural history and many individual observations recorded. A Field Day was held in May and the Christmas Bird Census carried out on December 26th. —HAROLD A. SENN.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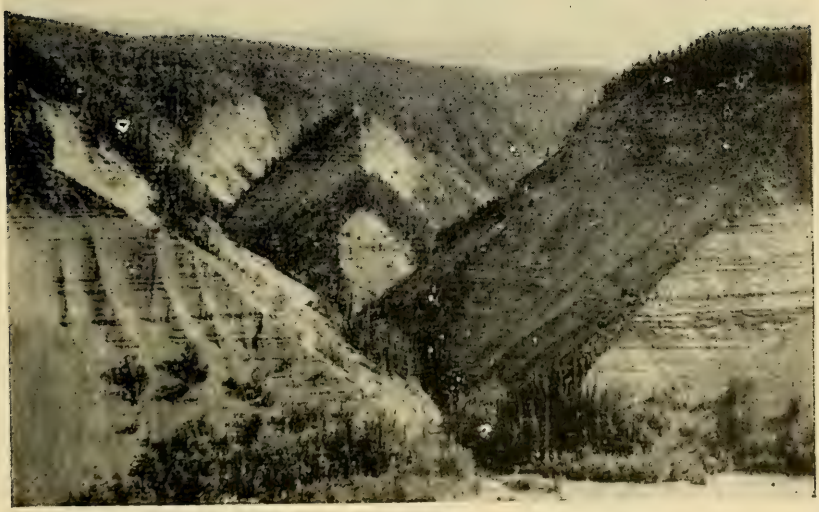

CHRISTMAS BIRD CENSUS — 1943[1]

PORT MOUTON, QUEEN'S CO., NOVA SCOTIA.— December 26, 1943; 10.00 a.m. to 4.30 p.m. Clear sky all day; about 1 in. old hard snow; no perceptible wind; temp. 22° at start, 34° at noon. Observer on foot and within 3 miles of Port Mouton. Red-throated Loon, 1; Cormorant (probably European), 2; Black Duck, 2; Golden-eye (probably American), 9; Old-squaw, 4; Northern Eider, 9; White-winged Scoter, 17; Nova Scotia Ruffed Grouse, 2; Great Black-backed Gull, 1; Herring Gull, 25; Northern Hairy Woodpecker, 2; Northern Downy Woodpecker, 1; Canada Jay, 1; Blue Jay, 1; Northern American Raven, 1; Eastern Crow, 11; Black-capped Chickadee, 2; Acadian Chickadee, 3; Brown Creeper,2; Eastern Robin, 1; Eastern Golden-crowned Kinglet, 2; Canadian Pine Grosbeak, 7; Common Snow Bunting, 18. Total, 23 species, 124 individuals.— Harold F. Tufts.

WOLFVILLE, NOVA SCOTIA.— December 27, 1943; 10.30 a.m. to 5.00 p.m. Partly overcast; about 2 in. soft melting snow; no perceptible wind; temp 34° at start. Two observers, sometimes together, sometimes separate. Observations within 10 miles of Wolfville. Travel chiefly by auto, with numerous side trips on foot. Black Duck, 5; Golden-eye (probably American), 1; American Common Merganser, 5; Nova Scotia Ruffed Grouse, 1; European Gray Partridge, 3; Common Pheasant, 2; Great Black-backed Gull, 1; Herring Gull, 8; Northern Flicker, 2; Blue Jay, 10; Northern American Raven, 2; Eastern Crow, 52; Black-capped Chickadee, 13; Acadian Chickadee, 9; White-breasted Nuthatch, 1; Red-breasted Nuthatch, 1; Eastern Robin, 2; Eastern Golden-crowned Kinglet, 1; Common Starling, 69; English Sparrow, 185; Common Redpoll, 45; Eastern Goldfinch, 12; Eastern Savannah Sparrow, 2; Slate-coloured Junco, 5; Eastern Tree Sparrow, 2; Eastern Song Sparrow, 1; Common Snow Bunting, 180. Total, 27 species, 620 individuals. Despite the fact that Evening Grosbeaks have been common here throughout the entire month of December, we were unable to observe one on the 27th. One of the Savannah Sparrows was collected, thus permitting determination of its sub-specific status as *savanna* rather than *labradorius*, as would have been expected here in winter.— R. W. Tufts and Rundall Lewis.

WINDSOR, NOVA SCOTIA.— December 26, 1943; 10.00 a.m. to 2.30 p.m. Sky clear, bright sun; 8 in. crusted snow; no wind; temp. 15° at start, 30° at noon. Two observers together on foot, within two miles of Windsor; area of about 9 sq. miles. European Gray Partridge, 10; Herring Gull, 2; Blue Jay, 3; Northern American Raven, 2; Eastern Crow, 75; Black-capped Chickadee, 16; Acadian Chickadee, 6; White-breasted Nuthatch, 4; Common Starling, 5; English Sparrow, 47; Eastern Evening Grosbeak, 22; Canadian Pine Grosbeak, 3; Eastern Goldfinch, 7. Total, 13 species, 202 individuals.— James C. Morrow and Robert S. Morrow.

QUEBEC, QUE. (Levis suburbs, Frazer wood and golf course area, Charlesbourg, along Shawinigan Power Transmission Line to Quebec Zoological Garden; Ste. Foy area; Cap Rouge and Quebec bridge area, including St. Lawrence shore from Cap Rouge to Union Cove; town suburbs 4%, fields 36%, coniferous forests 14%, deciduous woods 3%, mixed hardwood and coniferous forests 39%, shores 4%).— December 21, 1943. Heavy snowfall; temp. -8° to 14°; wind N.E., 1-7 m.p.h.; 18 to 20 in. of snow on ground; small rivers frozen over, large moving ice fields on St. Lawrence River. Three observers in 3 parties. Total hours, 20 on foot; total miles, 23 on foot. American Common Merganser (?), 2; Ruffed Grouse, 7; Ring-necked Pheasant, 1; Hairy Woodpecker, 3; Arctic three-toed Woodpecker, 1; Blue Jay, 1; Black-capped Chickadee, 27; Brown Creeper, 1; Common Starling, 170 (est.); English Sparrow, 54; Pine Grosbeak, 15; Redpoll (sp.?), 250 (est.); Snow Bunting 2. Total, 13 species; approximately 534 individuals. (Seen in area Dec. 22: American Crow, 1; Dec. 10: Evening Grosbeak, 1).— Mrs. Gus Langelier, Louis A. Lord, Raymond Cayouette. (La Société Zoologique de Québec.)

MONTREAL, QUE. (Mount Royal, La Salle Woods, St. Lawrence River, including Heron Island and Nuns' Island, and South Shore

1. —Received for publication June 13, 1944.

from Caughnawaga to Longueuil.).— December 19, 1943. Overcast, dull, light S.W. wind, with occasional light snowflurries, temp. 32°. Observers in five parties as follows: Party I (Mount Royal), 10 observers, 6 hours, 12 miles Party II (La Salle Woods), 2 observers, 4½ hours, 9 miles; Party III (St. Lawrence River, Heron Island, Nuns' Island), 2 observers, 6 hours, 12 miles by boat, 3 miles on foot; Party IV (Caughnawaga), 1 observer, 4 hours, 40 miles by car; Party V (Longueuil - La Tortue), 3 observers, 6 hours, 50 miles by car. Total observers, 18; Total hours, 26½; Total miles afoot, 24. Mallard, 1; Black Duck, 17; American Golden-eye, 450; American Common Merganser (including some not specifically determined), 49; Red-breasted Merganser, 1; Ring-necked Pheasant, 35; Great Black-backed Gull, 4; Herring Gull, 157; Great Horned Owl, 3; Short-eared Owl, 5; Yellow-shafted Flicker, 1; Hairy Woodpecker, 1; Downy Woodpecker, 14; Canada Jay, 1; American Crow, 2; Black-capped Chickadee, 91; White-breasted Nuthatch, 11; Brown Creeper, 17; American Robin, 1; Cedar Waxwing, 7; Common Starling, 1940 (partly est.); House Sparrow, 700 (partly est.); Red-winged Blackbird, 1; Pine Grosbeak, 55; Common Redpoll, 101; Snow Bunting, 331 (partly est.). Total, 26 species, approximately 4000 individuals. Both as to numbers of species and individual birds this is a record census for Montreal (previous record, 22 species in 1940).— Province of Quebec Society for the Protection of Birds.

HUDSON HEIGHTS, QUE. (vicinity of Hudson Heights and Hudson, including the whole of Whitlock Golf Club property. 40% mixed evergreen and deciduous woods, 20% second-growth and brush, 10% open farm land, 10% golf club open grass lands, 20% gardens and village).— December 19, 1943. Dull; temp. 28° to 32°; wind E., backing to S.E., 1-7 m.p.h.; bar. 30.1 to 29.8; ground covered with 6 to 8 in. of soft snow; all fresh water except fast running streams frozen over. Nine observers in 4 parties. Total hours, 23 (13½ on skis, 9½ on foot); total miles, 22½ (13½ on skis, 9 on foot). Ruffed Grouse, 3; Hairy Woodpecker, 3; Downy Woodpecker, 3; Blue Jay, 50; Black-capped Chickadee, 125; White-breasted Nuthatch, 8; Common Starling, 46; English Sparrow, 352; Evening Grosbeak, 40; Pine Grosbeak, 6; Common Redpoll, 147; Pine Siskin, 90; Eastern Goldfinch, 22; Slate-coloured Junco, 2; Tree Sparrow, 3; White-throated Sparrow, 1. Total, 16 species; 901 individuals, Mrs. R. L. Puxley, Mr. and Mrs. E. D. Croll, Mr. and Mrs. George and Miss D. D. Riley, Mr. and Mrs. G. G. Ommanney, all of Hudson Heights, Mr. N. M. Yuile of Como, Que.

OTTAWA, ONT. (radially about city).— December 26, 1943; 7.30 a.m. to 4.30 p.m. Low-level fog, 100 yards visibility, at 8.00 a.m. increasing to 1 mile by noon; 5-6 in. snow; gentle S.E. wind; temp. 15° at 8.00 a.m.; 28° at 1.30 p.m.; 14 observers in 9 parties. Total party hours on foot, 42; by car, 16. American Golden-eye, 54; American Common Merganser, 2; Ruffed Grouse, 3; Common Pheasant, 7; Glaucous Gull,1 (C.H.D.C.); Rock Dove, 39; Great Horned Owl, 2; Hairy Woodpecker, 10; Downy Woodpecker, 9; Blue Jay, 2; Black-capped Chickadee, 90; White-breasted Nuthatch, 17; Red-breasted Nuthatch, 1; Brown Creeper, 4; Golden-crowned Kinglet, 1; Common Starling, 203; English Sparrow, 538; Evening Grosbeak, 1; Pine Grosbeak, 49; Redpolled Linnet, 420; Pine Siskin, 31; American Goldfinch, 72. Total 22 species, 1,556 individuals. For the first time in the history of the Ottawa Christmas Bird Census no Crows were recorded.— Ottawa Field-Naturalist' Club.

Observers: R. M. Anderson, J. E. Brown, N. R. Brown, C. H. D . Clarke, R. E. DeLury, J. A. Enstone, B. A. Fauvel, Donald Gates, G. H. Hammond, T. S. Hennessy, Harrison F. Lewis, Hoyes Lloyd, D. A. Ross, E. A. Ross.

PAKENHAM, LANARK CO., ONT. — December 25, 1943; 9.15 a.m. to 12.00 m. and 2.00 p.m. to 5 p.m. Cloudy with light snow in the morning, sunlight in the afternoon; 3 in. snow; wind light; temp. 15° at start, maximum 34°. Observers separate. 7 miles on foot. American Golden-eye, 6; American Goshawk, 1; Ruffed Grouse, 4; Rock Dove, 36; Hairy Woodpecker, 2; Blue Jay, 9; American Crow, 16; Black-capped Chickadee, 20; White-breasted Nuthatch, 5; Golden-crowned Kinglet, 2; Common Starling, 47; English Sparrow, 105; Evening Grosbeak, 85; Redpolled Linnet, 8. Total, 14 species, 346 individuals. (December 24: Snow Bunting, 30.) —Edna G. Ross, Verna M. Ross.

PETERBOROUGH, ONT. — December 26, 1943. Fair, sunny, slight haze; 3 in. snow; wind S.E. variable, 5-10 m.p.h.; temp 10° to 25°. 4.5

hours, 7 miles on foot. Ruffed Grouse, 1; Ring-necked Pheasant, 3; Herring Gull, 4; Hairy Woodpecker, 2; Downy Woodpecker, 1; Blue Jay, 2; Black-capped Chickadee, 5; White-breasted Nuthatch, 2; Golden-crowned Kinglet, 2; Northern Shrike, 1; Common Starling, numerous; English Sparrow, numerous; Slate-coloured Junco, 5; Tree Sparrow, 17. Total, 14 species, 45 individuals, plus Starlings and English Sparrows. —J. L. McKeever.

COBOURG, ONT. (from Pratt's Pond N.E. to Baltimore through cedar woods along stream, returning through hardwoods and open fields). —December ....., 1943; 9.00 a.m. to 5 .00 p.m.. Clear; no snow; wind N. 13-18 m.p.h.; temp., 10° at start, 5° at finish. 8 hours, 7 miles on foot. Ruffed Grouse, 8; Herring Gull, 3; Great Horned Owl, 1; Downy Woodpecker, 1; Blue Jay, 2; Black-capped Chickadee, 22; White-breasted Nuthatch, 3; Brown Creeper, 3; English Sparrow, 11; Evening Grosbeak, 2; Eastern Purple Finch, 4; Pine Grosbeak, 1; Redpoll (sp?), 30; American Goldfinch, 2; Slate-coloured Junco, 14; Song Sparrow, 3; Snow Bunting, 2. Total, 17 species, 112 individuals. —Alec Lucas.

TORONTO, ONT. — December 26, 1943, 8.30 a.m. to 5.30 p.m. Mostly fair; very light wind; ground bare in open, light covering of snow in woods; temp. 20° at 8.00 a.m., maximum 30°. 65 observers covering 8 routes. Common Loon, 1; Great Blue Heron, 2; Baldpate, 2; Pintail, 8; Greater Scaup Duck, 2298; American Golden-eye, 430; Buffle-head, 41; Old-squaw, 106; Hooded Merganser, 1; American Common Merganser, 83; Cooper's Hawk, 4; Red-tailed Hawk, 8; American Rough-legged Hawk, 8; American Sparrow Hawk, 8; Ruffed Grouse, 6; Common Pheasant, 220; Glaucous Gull, 1; Great Black-backed Gull, 26; Herring Gull, 1601; Ring-billed Gull, 4; American Screech Owl, 6; Great Horned Owl, 15; Barred Owl, 2; Belted Kingfisher, 3; Yellow-shafted Flicker, 2; Pileated Woodpecker, 3; Hairy Woodpecker, 29; Downy Woodpecker, 55; Horned Lark, 1; Blue Jay, 138; American Crow, 5; Black-capped Chickadee, 422; White-breasted Nuthatch, 95; Red-breasted Nuthatch, 3; Brown Creeper, 24; Golden-crowned Kinglet, 35; Northern Shrike, 1; Common Starling, 1262; English Sparrow, 2026; Cardinal, 46; Evening Grosbeak, 25; Common Purple Finch, 8; Pine Grosbeak, 1; Hoary Redpoll, 1; Common Redpoll, 596; Pine Siskin, 23; American Goldfinch, 59; Eastern Towhee, 1; Slate-coloured Junco, 320; Oregon Junco, 1; Tree Sparrow, 414; White-throated Sparrow, 4; Swamp Sparrow, 5; Song Sparrow, 63; Snow Bunting, 1. Total, 55 species, 10,553 individuals. —J. L. Baillie, J. Barney, D. Beecham, G. S. Bell, A. Boissonneau, F. Cook, W. V. Crich, A. Cringan, J. Crosby, C. Davies, Mrs. C. Davies, P. Davies, D. Davies, O. E. Devitt, R. G. Dingman, Y. Edwards, F. H. Emery, B. Falls, A. M. Fallis, L. Farrand, P. Harrington, C. E. Hope, J. Ironside, R. F. James, G. Lambert, R. Lanning, R. V. Lindsay, J. MacArthur, J. W. MacArthur, R. MacArthur, D. MacDonald, W. C. Mansell, N. D. Martin, R. Measham, M. H. Mitchell, O. S. Mitchell, D. Muir, T. R. Murray, K. Nielsen, C. Proctor, H. Proctor, R. Ritchie, Richard Robinson, Ross Robinson, R. J. Rutter, R. Sachs, E. Satterly, J. Satterly, R. M. Saunders, D. Scovell, W. E. Shore, T. M. Shortt, W. J. Sisman, Mrs. W. J. Sisman, F. Smith, W. W. Smith, L. L. Snyder, H. H. Southam, J. Speakman, S. L. Thompson, R. D. Ussher, C. Wheeler, J. Wheeler, R. V. Whelan, W. Whelan (The Brodie Club).

HAMILTON, ONT. (Dundas Valley west to Ancaster; Hamilton and Harbor; Beach; Burlington; Bronte; Aldershot; Lake Medad; industrial waterfront 4%, suburban waterfront 12%, suburbs 11%, open farm land 10%, pasture land 8%, brush and mixed woodlands 49%, coniferous plantings 2%, marsh 4%).— December 19, 1943. Fair; ground bare; marshes frozen, bay open; wind S.W., 25 m.p.h.; temp. 30° to 34°. 36 observers in 16 parties and at 4 separate feeding stations. Total hours, 116; total miles, 159 on foot. Common Loon, 2; Great Blue Heron, 2; Black-crowned Night Heron, 1; Mallard Duck, 3; Black Duck, 70; Blue-winged Teal (small size and blue toward front of wing noted by R. B. and party), 1; Greater Scaup Duck, 105; American Golden-eye, 211; Buffle-head, 4; Old-squaw, 7; White-winged Scoter, 2; Hooded Merganser, 2; American Common Merganser, 220; Red-breasted Merganser, 21; American Goshawk, 2; Sharp-shinned Hawk, 1; Cooper's Hawk, 1; Red-tailed Hawk, 8; American Rough-legged Hawk, 1; Marsh Hawk, 1; American Sparrow Hawk, 5; Ruffed Grouse, 13; European Gray Partridge, 5; Common Pheasant, 21; American Coot, 2; Killdeer, 1; Red-backed Sandpiper, 3; Glaucous Gull, 1; Iceland Gull, 1; Great Black-

backed Gull, 73; Herring Gull (a Thayer's Gull identified at Bronte by J.A.C. by the *dark brown iris* and the *slightly grayish* black on the wing tips of a bird in full adult plumage), 3638 (est.); Ring-billed Gull, 7; Mourning Dove, 2; American Screech Owl, 2; Great Horned Owl, 7; Barred Owl, 1; American Long-eared Owl, 1; Belted Kingfisher, 3; Yellow-shafted Flicker, 1; Pileated Woodpecker, 2; Hairy Woodpecker, 15; Downy Woodpecker, 44; Horned Lark, 6; Blue Jay, 78; Black-capped Chickadee, 389; White-breasted Nuthatch, 61; Red-breasted Nuthatch, 2; Brown Creeper, 18; Long-billed Marsh Wren (in separate marshes, G.N.), 3; American Robin, 1; Golden-crowned Kinglet, 95; Cedar Waxwing, 10; Common Starling, 473 (est.); Maryland Yellow-throat (G.N.), 1; English Sparrow, 1290 (est); Cardinal, 52; Common Redpoll, 50 (est.); American Goldfinch, 3; Eastern Towhee, 2; Slate-coloured Junco, 195; Tree Sparrow, 221; Chipping Sparrow (R.B. & G.N.), 2; Field Sparrow (G.N. 7, J.M.S. 2, W.W. 1), 10; White-throated Sparrow, 1; Swamp Sparrow, 2; Song Sparrow, 40. Total, 66 species; 7518 individuals. —J.E. Bachelor, Eric Bastin, Clifford Boden, Don, Neil, Janet, and Mr. and Mrs. R. D. F. Bourne, Jack and Wm. Campbell, N. C. Clarke, Ken Cox, John A. Crosby, Jean Gall, Don Hassell, Peter Henderson, A. B. Jackson, H. E. Kettle, H. G. Lumsden, Mrs. F. E. MacLoghlin, Miss J. M. Magee, Eleanor Malcolm, Jack Martin, G. O. McMillan, Ruby Mills, Gertrude Nelson, Gordon Nelson, G. W. North, Mrs. H. C. Nunn, Mr. and Mrs. J. M. Speirs, Laura Stewart, Wm. Walker, J. H. Williams, Laurel Williams, Ron. Wootton (members Hamilton Nature Club).

KITCHENER AND WATERLOO, ONT. —December 28, 1943; 8.15 a.m. to 5.30 p.m. (E.D.T.). Mostly clear, except briefly toward noon; little snow on ground, including light fall between 10.00 a.m. and 11.00 a.m.; wind northerly, moderate; temperature 17°-24°-15°, or lower late in day. Only 4 observers in 2 equal parties, one working southward (mainly Parkway to Doon), the other north (Bridgeport Dam). All ducks, south party.

Mallard Duck, 4; Black Duck, 20; Common Golden-eye, 48; Hooded Merganser, 1; Common Merganser, 28; Ruffed Grouse, 4; Herring Gull 79; Northern Flicker, 2; Hairy Woodpecker, 1; Downy Woodpecker, 7; Blue Jay, 2; Black-capped Chickadee, 70; White-breasted Nuthatch, 12; Red-breasted Nuthatch, 3; Brown Creeper, 12; Golden-crowned Kinglet, 32; Common Starling, 22+; English Sparrow, 80+; Cardinal, 4; Redpolled Linnet, 1; American Goldfinch, 40; Slate-coloured Junco, 69; Tree Sparrow, 40. Total, 23 species, 581+ individuals. Birds seemed fairly numerous, and, although well distributed, at least south of the city, were for the most part not difficult to locate.— W. Bergey, R. Bowman (south party); F. W. R. Dickson, J. George (north party).

LONDON, ONT. (from city along Thames River to a point 15 mi. west. Deciduous woodlots 70%, spruce bog 10%, open territory 20%).— December 26, 1943. Fair in a.m., rainy in p.m.; 1 to 2 in. snow; wind E., 1-7 m.p.h.; temp. 26° to 36°. 18 observers in 7 parties. Total hours 23, on foot. Total miles 16, on foot. Great Blue Heron, 1; Black Duck, 3; American Golden-eye, 741; American Common Merganser, 62; Cooper's Hawk, 1; Red-tailed Hawk, 4; American Rough-legged Hawk, 1; Bald Eagle, 3; Marsh Hawk, 2; Ring-necked Pheasant, 1; Herring Gull, 21; Hairy Woodpecker, 3; Downy Woodpecker, 28; Blue Jay, 15; American Crow, 23; Black-capped Chickadee, 192; White-breasted Nuthatch, 22; Red-breasted Nuthatch, 2; Brown Creeper, 12; Winter Wren, 1; Golden-crowned Kinglet, 60; Common Starling, 16; English Sparrow, 70; Cardinal, 83; Common Purple Finch, 3; American Goldfinch, 5; Slate-coloured Junco, 87; Tree Sparrow, 136; Song Sparrow, 4. Total, 29 species, approximately 1602 individuals. — E. Davis, Frances Girling, K. Fetherston, M. Stewart, J. Eadie, T. Roberts, H. MacMahon, J. Kormos, P. Tobias, B. Camp, C. Whitelow, T. Garside, J. Leach, E. Frith, M. Fetherston, B. Haggis, H. Girling.

CHATHAM, ONT.— December 22, 1943, 8.30 a.m. to 6.45 p.m. Partly cloudy with occasional snow flurries; ground partially covered with snow, all ponds and small bodies of water frozen over, lake shore partially frozen for one-half mile out, the river Thames had some open water in the rapids only; cold N.W. wind; average temp. 16°. Great Blue Heron, 2; Black-crowned Night Heron, 1; Mallard Duck, 8; Black Duck, 3527; Canvas-back, 2; American Golden-eye, 206; White-winged Scoter, 2; Hooded Merganser, 14; American Common Merganser, 60; Red-breasted Merganser, 3;

American Goshawk, 1; Sharp-shinned Hawk, 2; Cooper's Hawk, 3; Red-tailed Hawk, 17; Red-shouldered Hawk, 1; American Rough-legged Hawk, 4; Bald Eagle, 11; Marsh Hawk, 12; American Sparrow Hawk, 3; Bob-white, 89; Ring-necked Pheasant, 5; American Coot, 3; Herring Gull, 32; Ring-billed Gull, 3; Bonaparte's Gull, 50; Rock Dove, 175; Mourning Dove, 94; American Screech Owl. 4; Great Horned Owl, 4; American Long-eared Owl, 7; Yellow-shafted Flicker, 2; Hairy Woodpecker, 10; Downy Woodpecker, 28; Blue Jay, 15; American Crow, 2000+; Black-capped Chickadee, 133; White-beasted Nuthatch, 28; Red-breasted Nuthatch, 3; Brown Creeper, 15; Golden-crowned Kinglet, 17; Common Starling, 263; English Sparrow, 2100; Eastern Meadowlark, 2; Bronzed Grackle, 3; Cowbird, 2; Cardinal, 35; Common Redpoll, 1; American Goldfinch, 64; Eastern Towhee, 1; Slate-coloured Junco, 76; Oregon Junco, 1; Tree Sparrow, 474; Song Sparrow, 2; Lapland Longspur, 6. Total: 54 species, 9626 individuals. The following members and associates of the Kent Nature Club, Chatham, participated in the census: K. C. Annable, D. A. Arnott, Dr. C. C. Bell, Dr. L. J. Bohn, Melvin Dunlop, Wililam Gray, C. H. Hand, William Illman, Fred Jordan, George McGarvin, Gordon McGregor, O. Moore, Metro Sass, W. N. Sexsmith, Dr. Geo. M. Stirrett, A. A. Wood, Mr. and Mrs. H. B. Wressell, D. Harry Young, Perry Zavitz.

SARNIA, ONT. (northern St. Clair River to Lake Huron, 1 mi. along shore of Lake Huron, through Canatara Park and over open fields inland from lake).— December 27, 1943; 10.30 a.m to 4.30 p.m. Overcast; rain during previous 24 hours; ground bare; river bank, lake shore and bays well covered with ice; temp. 37°at start, 35° on return. 3 observers in 1 party on foot. Greater Scaup Duck, 121; Lesser Scaup Duck, 130; American Golden-eye, 40; American Common Merganser, 36; Marsh Hawk, 1; Bob-white, 11; Herring Gull, 321; Hairy Woodpecker, 1; Downy Woodpecker, 1; Blue Jay, 17; Black-capped Chickadee, 10; White-breasted Nuthatch, 2; Golden-crowned Kinglet, 3; Common Starling, 75; English Sparrow, 500+; Tree Sparrow, 55. Total, 16 species, 1324 individuals. Dec. 18, Ring-billed Gull, 70.— Angus Buchanan, Bobby Pack, Donald Hollingworth.

BARRIE, ONT. (east end of town and McCuaig, Gilchrist, and Rowe woods).— December 27, 1943; 9.30 a.m. to 5.00 p.m. Overcast; a few light showers; 12 in. snow on level, deeper in woods; no wind until 3.00 p.m., then strong E. wind; temp. 40°. 1 party of 3 observers. 8 mi. on foot, 5 mi. by car. Ruffed Grouse, 7; Herring Gull, 50; Rock Dove, 30; Pileated Woodpecker, 1; Hairy Woodpecker, 2; Downy Woodpecker, 4; Blue Jay, 6; American Crow, 1; Black-capped Chickadee, 25; White-breasted Nuthatch, 2; Red-breasted Nuthatch, 10; American Robin, 1; Common Starling, 100+; English Sparrow, 100+;Red-winged Blackbird, 1; Cardinal, 1; Evening Grosbeak, 25; Common Purple Finch, 3; Common Redpoll, 75; Tree Sparrow, 50; Snow Bunting, 100. Total, 21 species, 594 individuals. Kempenfeldt Bay froze over on Dec. 23. Immediately prior to that the following birds were identified within the town limits: Common Loon, 3; Holboell's Grebe, 6; Scaup Duck, (sp.?), 8; Golden-eye (sp.?), 2; Buffle-head, 3; Old-squaw, 3; Harlequin Duck, 1; White-winged Scoter, 3; Red-breasted Merganser, 3; Bonaparte's Gull, 12; Belted Kingfisher, 1. On several occasions during 4 days the Harlequin Duck was carefully observed through a Zeiss 8x40 glass at a distance of not more than 100 yards. In size, plumage, and 3 white markings on side of head it fitted in perfectly with descriptions and illustrations of female Harlequins as given by Peterson, Taverner, and others. Dec. 25, Lapland Longspur, 7.— Jim Gilmore, Ralph Knowles, E. L. Brereton.

MEAFORD, ONT. (harbour and shoreline eastward 2 mi.).— December 27, 1943; 11.00 a.m. to 3.00 p.m. Overcast; little wind, temp. 35°. 10 observers in 1 party. Common Loon, 1; American Golden-eye, 21; American Common Merganser, 16; Ruffed Grouse, 5; Great Black-backed Gull, 1; Herring Gull, 335+; Downy Woodpecker, 2; Blue Jay, 3; Black-capped Chickadee, 11; White-breasted Nuthatch, 2; Common Starling, 21; House Sparrow, 130+; Pine Grosbeak, 2; Tree Sparrow,2. Total, 14 species, 552 individuals.— L. H. Beamer.

SOUTH PORCUPINE, ONT. (small area of forest and open fields N. of town, forest 3 mi. N. along Davidson Road and 2 mi. W. along Timmins Road).— December 19, 1943; 9.00 a.m. to 6.00 p.m. Heavy snowfall in a.m., clearing somewhat in p.m.; 15 to 20 in. snow; wind S.W., 13-18 m.p.h.; temp. 29° to

30°. Total miles, 13 on foot; total hours, 9 on foot. 2 observers together. American Hawk Owl, 1; Hairy Woodpecker, 2; Downy Woodpecker, 2; Arctic Three-toed Woodpecker, 2; Canada Jay, 4; Black-capped Chickadee, 14; Hudsonian Chickadee, 8; English Sparrow, 11; Redpoll (sp.?), 32. Total, 9 species, 76 individuals.— Alec Lucas, E. Welsh.

FORT WILLIAM - PORT ARTHUR, ONT. (area 15 miles W. of Fort William and 10 miles N.E. of Port Arthur).— December 27, 1943; 1.00 p.m. to 5.00 p.m. Clear at first, overcast later; 8 in. snow; temp. 10° to 20°. 8 observers in 2 parties; 60 mi. by auto, 8 on foot. Ruffed Grouse, 1; Herring Gull, 8; Rock Dove, 8; Great Horned Owl, 2; Canada Jay, 1; Blue Jay, 1; Raven, 1; Common Starling, 2; English Sparrow, 8; Evening Grosbeak, 24; Pine Grosbeak, 23; Common Redpoll, 40; Snow Bunting, 12. Total, 13 species, 131 individuals. Seen Dec. 26: Common Pheasant, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; Black-capped Chickadee, 1; Brown-headed Chickadee, 1; (Dec. 31): American Crow, 20. Starlings very uncommon; apparently now migrate. Pine Grosbeaks uncommon as crop of Rowan berries very poor. Evening Grosbeaks more common than usual, possibly because of a heavy crop of seeds on the Manitoba Maples.— A. E. Allin, D. E. Allin, D. Beckett, A. Kyander, J. Lowcock, C. Macdonald, Mrs. Murison, L. Slichter. (Thunder Bay Field-Naturalists' Club).

YORKTON, SASK. (area 15 mi. in diameter with Yorkton as center).— December 26, 1943; 10.00 a.m. to 5.00 p.m. Clear, bright day; wind N.W., 5 m.p.h.; only about 1 in. snow on fields; temp. -10° at start, -5° at finish. 9 observers in 5 groups. Total party hours afield, 9 (5 by car and 4 on foot); total party miles, 46 (40 by car and 6 on foot). American Goshawk, 5; Sharp-tailed Grouse, 28; Hungarian Partridge, 15; Great Horned Owl, 3; Snowy Owl, 3; Hairy Woodpecker, 2; Downy Woodpecker, 1; Blue Jay, 1; American Magpie, 2; Black-capped Chickadee, 6; English Sparrow, 77; Redpoll (sp?), 41 (est.); Snow Bunting, 866 (est.). Total, 13 species, approximately 1050 individuals. Bohemian Waxwings Dec. 17.— Vernon Barnes, Mary Black, W. A. Brownlee, Dr. C. J. Houston, C. Stuart Houston, V. Kristjanson, Mrs. I. M. Priestly, Michael Priestly, Jim Rogerson (members of Yorkton Natural History Society).

CAMROSE, ALBERTA. (By auto 6 mi. S. of Camrose to Battle River, 5 mi. walk through spruce woods along river, return to Camrose by W. bridge and road).— December 24, 1943; 11.00 a.m. to 5.00 p.m. Clear; no wind; 1 in. snow; temp. at start 20° and following 3 hours above freezing. Mallard Duck, 7; Ruffed Grouse, 1; Sharp-tailed Grouse, 1; Common Pheasant, 3; Great Horned Owl, 1; Snowy Owl, 1; Pileated Woodpecker, 2; Hairy Woodpecker, 2; Downy Woodpecker, 1; Blue Jay, 10; Magpie, 10; Long-tailed Chickadee, 20; Bohemian Waxwing, 20; House Sparrow, 100; Pine Grosbeak, 75; Common Redpoll, 100. Total, 16 species, 354 individuals. Bald Eagle killed S. of Camrose Dec. 5. Absence of Snow Buntings notable this winter.— Frank L. Farley and Roy Anderson.

CRESCENT B.C. (By rowboat up Nickomekl River also coastline at Ocean Park and Crescent by car and on foot).— December 28, 1943; 9.00 a.m. to 1.00 p.m. and 2.00 p.m. to 6.00 p.m., P.D.T. Bright and sunny all day; no wind; temp. 32° at sunrise. 2 observers together. Common Loon, 11; Holboell's Grebe, 3; Horned Grebe, 32; Western Grebe, 1; Northwest Coast Heron, 10; Black Brant, 50+; Mallard Duck, 125+; Pintail, 316+; Green-winged Teal, 19; Canvas-back, 20, Greater Scaup Duck, 34; American Golden-eye, 53; Buffle-head, 24; Old-squaw, 2; Harlequin Duck, 12; White-winged Scoter, 183+; Surf Scoter, 130+; American Scoter, 25+; American Common Merganser, 6; American Coot, 1; Black-bellied Plover (?), 10; Red-backed Sandpiper (?), 1; Glaucous-winged Gull, 23; Thayer's Gull, 6; Short-billed Gull, 29; Belted Kingfisher, 2; Northwestern Red-shafted Flicker, 4; Gairdner's Woodpecker, 1; Northwestern Crow, 5; Oregon Chickadee, 1; Winter Wren, 1; Golden-crowned Kinglet, 6; Meadowlark (sp.?), 1 (singing); Brewer's Blackbird, 75; Purple Finch (sp?), 27; Oregon Towhee, 2; Oregon Junco, 17; Rusty Song Sparrow, 17. Total, 38 species, 1285+ individuals.— Martin W. Holdom, Frances E. L. Holdom.

COURTENAY-COMOX, VANCOUVER ISLAND, B.C. (1 mi. W. of town, through town, river bank, estuary and sea shore, covering adjoining cultivated land).— December 26, 1943; 8.30 a.m. to 4.30 p.m. (War time). Dull, turning in afternoon to strong S.E. wind, which greatly militated against recording, particularly of

land birds. Temp. around 43°; fall has been very open. Observers together, 10 mi. on foot. Lesser Loon, 3; Red-throated Loon, 2; Holboell's Grebe, 4; Horned Grebe, 3; Western Grebe, 3; Pelagic Cormorant, 3; Mallard Duck, 125+; Baldpate, 900 (est.); Green-winged Teal, 8; Shoveller, 1; Canvas-back, 14; Greater Scaup Duck, 276+; American Golden-eye, 270+; Barrow's Golden-eye, 20; Buffle-head, 27+; White-winged Scoter, 1000+; Surf Scoter, 200+; American Scoter, 2; Hooded Merganser, 4; American Common Merganser, 35; Red-breasted Merganser, 9; Bald Eagle, 1; Ring-necked Pheasant, 8; American Coot, 65; Killdeer, 100+; Glaucous-winged Gull, 2000+; Herring Gull (subsp.?), 3; Short-billed Gull, 7; Western Belted Kingfisher, 2; Northwestern Red-shafted Flicker, 5; Pileated Woodpecker, 1; Gairdner's Woodpecker, 1; Crow (Western and Northwestern), 1350; Chestnut-backed Chickadee, 14; Red-breasted Nuthatch, 1; Western Winter Wren, 3; Seattle Wren, 8; Western Robin, 2; Western Golden-crowned Kinglet, 20+; English Sparrow, 4; Brewer's Blackbird, 55; Purple Finch (sp.?), 16; Pine Siskin, 200; Oregon Towhee, 4; Slate-coloured Junco (male at close range), 1; Oregon Junco, 100 (est.); Rusty Song Sparrow, 10. Total, 47 species, 6890 individuals. Noted on same route within 48 hours, Northwest Coast Heron, Raven, Sitka Kinglet, Fox Sparrow.— Theed Pearse, A. R. Davidson.

NOTICE OF MOTION

Mr. President,

I wish to give notice that, at the next Annual Meeting of this Club, I shall propose that the following amendments to the Constitution of this Club be made.

1. That Item (*h*) of Article III be deleted.

2. That the statement "No membership fee shall be expected from Corresponding or Honorary Members" be inserted as a third sentence in Article IV.

3. That items (b), (c), (d), (e), (f), (g), of Article III become respectively Items (c), (d), (e), (f), (g), (h).

4. That in Article III a new Item (b) be inserted — — to read as follows:

> (b) ASSOCIATE: Any resident in the Ottawa district who is interested in Natural History may, with the approval of the Excursions and Lectures Committee, be elected by Council an Associate Member of the Club. Associate members shall receive notification of, and be eligible to participate in such activities of the Club as shall be agreed upon by Council.

5. That Sentence 1 of Article IV be amended to read as follows:

> The annual Membership fee for Active Members shall be two dollars and for Associate Members shall be one dollar, payable in advance immediately after the Annual Meeting.

6. That Sentence 4 of Article X be amended to read as follows:

> None but Active Members of the Club shall have a vote or be eligible for any of the above elections or appointments.

7. That in Sentence 2 of Article XX "active" be inserted before "member".

8. That Sentence 1 of Article XXI be amended to read as follows:

> An amendment to this Constitution may be passed at an Annual Meeting of the Club by a two-thirds vote of the active members present, notice having been given to the Council at least two months previous to such Annual Meeting or at a previous Annual Meeting.

Pauline Snure (signed).

NOTES AND OBSERVATIONS

THE SCREECH OWL IN CENTRAL ALBERTA. — Through the kindness of Mr. A. D. Henderson, of Belvedere, I am permitted to record the occurrence of the screech owl (*Otus asio* (Linn.)) in Central Alberta. In a letter to me dated January 14, 1944, Mr. Henderson says: "On November 28, 1942, Herman Berglund, who works for me, came to the house and said there was a small owl sitting on a fence post at the rear of my chicken house. I hurriedly took my binoculars and went out expecting to see a saw-whet or Richardson owl, or even a pygmy owl. I had a good view of the bird at close range and was much surprised to see that it had ear-tufts, showing it to be a screech owl It was about the size of Richardson owl but of stouter build. I went to the house to get the gun but when I returned it had disappeared. It is unfortunate that I was unable to collect it so as to determine whether it was the typical form or one of the subspecies". As far as I am aware this is the first recorded appearance of the screech owl in Alberta. While I am reluctant to accept sight records of rare birds far from their ordinary habitat, I have no hesitancy whatever in accepting the judgement of such an experienced and careful observer as Mr. Henderson. —FRANK L. FARLEY, CAMROSE, ALBERTA.

A POSITIVE PYROTROPISM. — On July 31, 1930, I had the interesting if not exactly pleasant experience of fighting side by side with the rangers of the Bow Forest Reserve in the Alberta foothills against a forest fire. The day was hot, there was no water handy, and practically no soil to dig. The fire was a dry thunderstorm product which refused to be suppressed, and the air was full of smoke and the smell of burning lodge pole pines. Altogether, the circumstances were such as to produce sweat and weariness, and to blunt interest in anything except water and the job in hand.

In spite of the circumstances an observation in natural history forced itself upon us. During a breathing spell in the fight someone remarked "Look at all the bees" I became interested, and saw at once that there were not bees, but hundreds of horntails around us. They were lighting on the still-living lodge pole pines (*Pinus contorta*) and ovipositing. Nothing was plainer than that the fire had drawn them to the scene.

Fire is no stranger in the east slope, and must have been present constantly since the inception of the present forest complex. There has been ample opportunity for the horntails to develop, as they seem to have done, a positive pyrotropism.

Unfortunately specimens of the insect were not collected; it was prominently marked with tan-coloured bands. —C. H. D. CLARKE, OTTAWA.

SASKATCHEWAN RECORDS OF THE WHOOPING CRANE (*Grus americana*). — The whooping crane has become so rare during the past fifty years, that I believe the following records of its occurrence in the province of Saskatchewan are worthy of mention. Mr. W. C. Barrie, of Edmonton, has an exceptionally fine specimen in his possession that was killed in the fall of 1910, by William Kirkwood of Davidson, Saskatchewan. The bird was secured north-east of that town, on section 27, township 34, range 27, west of the Third meridian. In company with it were three others which were believed to be it's mate and two young. Mr. Barrie's bird was mounted by the pioneer taxidermist of the west, the late Mr. Ed. Darby, of Winnipeg, incidentally a schoolmate of mine in the early '80s. In the spring og 1918, Mr. Barrie saw a pair of whooping cranes at the north end of Long Lake, Saskatchewan.

Mr. John O. Williams, a well-driller, formerly of Camrose, wrote me some years ago that he saw several whooping cranes in October 1928, near the village of Henshell, Saskatchewan, on sections 4-5-6 and 7, in township 31, range 17, west of the Third meridian. In September 1927 he noted several in the vicinity of Rosetown, Saskatchewan. — FRANK L. FARLEY, CAMROSE, ALTA.

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THE CANADIAN FIELD-NATURALIST

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CONTENTS

PAGE

The Birds of Ottawa, 1944. By Hoyes Lloyd 143
Albert Burton Gresham; 1905-1941. By J. Dewey Soper 176
Early Studies of Milkweed Utilization in Canada. By Harold A. Senn 177
Notes on the Palm Warbler, *Dendroica palmarum* (Gmelin) in Canada. By A. L. Rand 181
Notes and Observations:-
Clarke's Nutcracker, *Nucifraga columbiana*, at Banff. By N. B. Sanson 182
Current Literature 175, 180

The official publications of THE OTTAWA FIELD-NATURALISTS' CLUB have been issued since 1879. The first were *The Transactions of the Ottawa Field-Naturalists' Club*, 1879-1886, two volumes; the next, *The Ottawa Naturalist*, 1886-1919, thirty-two volumes : and these have been continued by *The Canadian Field-Naturalist* to date. *The Canadian Field-Naturalist* is issued bi-monthly. Its scope is the publication of the results of original research in all departments of Natural History.

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VOL. 58 SUTTON WEST, CANADA SEPTEMBER-OCTOBER, 1944 No. 5

THE BIRDS OF OTTAWA, 1944[1, 2]

By HOYES LLOYD

Ottawa

35,343

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A GENERAL LIST of the Birds of Ottawa was published in 1923-1924[3], and there have been three addenda[4].

This 1923 list gave a brief account of earlier ornithological work in the district and was extensively annotated so that the sources of information it contained might be traced to the original records, also the addenda to this list gave detailed references to original sources. This is mentioned here because it is planned to use much of the basic material included in these published lists without repeating the references. Briefly, the early ornithological record for the district is recorded in three articles. The first, entitled "List of Birds found in the vicinity of Ottawa City, specimens of which have been shot within the last few years", unsigned, was written by the Ornithological and Oological Branch of the Club for the year, George R. White and W. L. Scott, (*Ott. Field-Nat. Club.* Trans. Vol. 1, 1881-2). The second, which will be found in the *Ottawa Naturalist*, V, 1891-2, entitled "The Birds of Ottawa", was compiled by the leaders of the Ornithological Branch for the year, A. G. Kingston, W. A. D. Lees, and Prof. J. Macoun. The third, written by C. W. G. Eifrig, entitled "The Birds of Ottawa" may be found in *The Ottawa Naturalist*, 1910-11.

The present list has been prepared at the request of the Ottawa Field-Naturalists' Club to bring up to date, revise, and consolidate all the available information on the subject so far as possible. Incidentally it is the fifth general list published by the Club. It will be annotated in detail concerning only those records which have become available since February 28, 1935, the closing date for the addenda published in the December 1936 *Canadian Field-Naturalist*.

The Club asked that migration dates be included. Those given at the close of comment upon most species are from the series "The Migration of North American Birds" which was written by Prof. W. W. Cooke, and later by Dr. H. C. Oberholser, with credit to Miss May T. Cooke, and published in *Bird-Lore*, between 1903 and 1924. The authors state that these are chiefly from data in the Biological Survey. I have learned that the Ottawa records in the survey include the following: from C. W. G. Eifrig, Spring 1905-1909; Fall 1907 and 1908; H. Groh, Spring of 1909, 1910 and 1914: G. R. White, 1884-1927, both spring and fall, except for about 8 years of fall data: E. F. G. White, 1928. Thus George White's migration dates are the ones which make up the most of this record. Some day perhaps, someone who has the Biological Survey data before him will gather together and consolidate with these all the other scattered migration data for the area. This is not possible now. However all our present observers are urged to keep complete roll-books showing presence or absence of birds day by day and thus furnish the basis for further study of this fascinating subject.

The following Bulletins of the United States Biological Survey, all by Wells W. Cooke, have been consulted for Ottawa data: Distribution and Migration of North American Ducks, Geese and Swans, 26; Distribution and Migration of North American Shorebirds, 35; Distribution and Migration of North American Herons and their Allies, 45; Distribution and Migration of North American

1. —Consolidated to February 29, 1944.

2. —Received for publication, April 6, 1944.

3. —Can. Field-Nat., 37: 101-5, Sept., 1923; 125-7 Oct., 151-6 Nov.; 38: 10-16, Jan., 1924.

4. —(a) Can. Field-Nat., 39: 16-17, Jan., 1925; (b) Can. Field-Nat., 46: 123-7 Sept., 1932: 162-6, Oct., 1932, (The Birds of Ottawa—addenda to February 28, 1930); (c) Can. Field-Nat., 50: 143-4, Dec. 1936.

Vol. 58, No. 4, July-August, 1944, was issued November 22, 1944.

Rails and their Allies, 128; and Distribution and Migration of North American Gulls and their Allies, 292.

The national collection of birds and other records have been available to me through the courtesy of officers of the National Museum of Canada. Manuscript notes for the period since February 28, 1935 have been furnished by E. F. G. White, C. E. Johnson, A. E. Bourguignon, and H. F. Lewis.

The Ottawa district has long been defined as the area in Ontario and Quebec falling within a circle of thirty miles radius, the centre being the Capital. For greater definiteness the centre is here considered to be the National War Memorial in Ottawa.

The description of the district given in the Ottawa Naturalist in 1891-2 still applies and is quoted below:

"The district covered by this list is embraced within a circle of thirty miles radius, with the City of Ottawa as its centre. It includes, roughly speaking, the Counties of Carleton and Russell, in Ontario, and the Southern portion of the County of Ottawa, in Quebec[5], and lies between 45° and 46° N. Lat. The Northern portion of this district is covered by what may be termed the first range of the Laurentian Hills, one of which known as King's Mountain, has an elevation of 1,125 feet above sea level, and rises about 900 feet above the large alluvial plain[6] lying between it and the Ottawa River. These hills are covered with a great variety of deciduous and evergreen trees, and among them are numerous mountain lakes, varying in size from mere ponds to lakes of five miles and upwards in length. Flowing from the North through this range of hills, the rapid river Gatineau empties, opposite the city, into the Ottawa, which flows from the West across the centre of the district, widening above the City, with a Southward sweep into a broad and beautiful sheet of water known as Lake Des Chenes, and again narrowing at the City where, falling over a limestone ridge, it forms the well known Chaudiere Falls. Below these its course is straighter and narrower, and about twenty miles down it receives from the North the waters of another rapid stream, the Du Lievre. South of the Ottawa is a somewhat undulating tract of country, drained principally by the Rideau, which joins the Ottawa at the City. It is rather a sluggish stream in its upper reaches, through being dammed back at various points for canal purposes, and thus affords several excellent resorts for marsh birds. Much good farming land, with occasional hardwood ridges, is to be found in this part of the district, as well as swamps overgrown with tamarac, cedar, and other cone-bearing trees. The largest of these swamps is a peat-bog in Gloucester Township, known as the Mer Bleue, which covers several thousand acres of land, carpeted to a great depth with sphagnum moss, and produces immense quantities of berries of many kinds, notably cranberries and blueberries[7].

Thus it will be seen that the district in its various parts offers attractive breeding and feeding grounds for many diverse forms of bird life, and as there are parts of it as yet little explored by the ornithologist, it may still be looked to to yield new records, as well as much valuable information, of the breeding and other habits of many species of which too little is now known."

In this check list species are numbered consecutively; sub-species are lettered when more than one is recorded under a species. The order and scientific nomenclature is that of the A.O.U. Check-List, 1931. Common names are generally those of Taverner's, Birds of Canada.

The number of species in the list after the 1936 addendum was 250. Since then one species was dropped because the Check-List now includes the former *Falco islandus* in the species *Falco rusticolus*; and six species, whistling swan, Swainson's hawk, European partridge, ruddy turnstone, western willet, and Caspian tern are added, making the present total 255 species.

5. —This does not apply now: the counties involved in Quebec are Pontiac, Gatineau, and Papineau. Ornith. Ed.

6. —A portion of the Champlain lowland formed by deposition of clay and sand during Post-glacial Champlain marine submergence. -- M.E.W.

7. —Conditions in the Mer Bleue have been much altered by drainage, the cutting of timber and practice-bombing by aircraft.

ANNOTATED LIST OF BIRDS

1. *Gavia immer immer* (Brünnich).

Common Loon.— Moderately common transient and summer resident; occasional in winter; breeds. While found on almost all our waterways, to be expected most regularly on the clear lakes of the Laurentian highland where it occurs throughout the nesting season. Formerly many were brought to taxidermists, but the species now enjoys protection under the law and is generally valued for aesthetic reasons. A few winter records indicate that the bird sometimes can exist for a time at least on swift river waters when all the lakes are frozen. Winter dates are December 18, 1905, and February 16, 1922. A nest with eggs is recorded at Lac la Pêche, Quebec, in late May 1881: Taverner and Blakely found adults with young on the Rideau River above Kemptville, June 1918.

2. *Gavia stellata* (Pontoppidan).

Red-throated Loon.— Regular but uncommon transient. Most of the recorded observations appear to be in fall. Specimens in the national collection are dated Nov. 12, 1885 and Dec. 10, 1917.

3. *Colymbus grisegena holboelli* (Reinhardt).

Holboell's Grebe.— Moderately common transient spring and fall. Some recorded specimen dates are Oct., 1881; May 5, 1885; May 21, 1885; Oct. 23, 1885; Oct. 31, 1903; Nov. 25, 1908. One captured alive on Feb. 26, 1904, as reported by Eifrig, and another brought to me alive from the vicinity of Kemptville, Feb. 12, 1930, may indicate unseasonably early migration attempts which must usually end disastrously in our climate.

4. *Colymbus auritus* Linnaeus.

Horned Grebe.— Moderately common transient, spring and fall. Specimen dates are May, 5, 1885; Oct. 31, 1903; and Nov. 4, 1888. There is one summer record, a specimen taken by Mr. Menzies on June 29, 1885.

5. *Podilymbus podiceps podiceps* (Linnaeus).

Pied-billed Grebe.— Moderately common summer resident; breeds. E. G. White noted it as common at Shirley's Bay on Oct. 12, 1903, and Taverner and Patch report it at the Petrie Islands, Sept. 9-11, 1918. There is a specimen in the National Museum taken about December 1, 1938, by E. G. White. A female with small young was taken at Ottawa on August 15, 1885.

6. *Oceanodroma castro castro* (Harcourt).

Madeira Petrel.— Accidental; one record, a bird picked up alive on the Rideau River by Master Bunny Sunderland and Mr. James Austin, August 28, 1933.

7. *Pelecanus erythrorhynchos* Gmelin.

White Pelican.— Accidental; one record, one taken at Manotick by John Flann, Jr., on May 25, 1904.

8. *Moris bassana* (Linnaeus).

Gannet.— Accidental; five specimens: a bird taken by J. H. Slack at Shirley's Bay on Oct. 13, 1909; one taken on the Gatineau River; one killed by the owner of a flock of domestic geese at Richmond, Ontario, about Oct. 15, 1924; a juvenile picked up dead at Aylmer, Quebec, Oct. 15, 1929; and a juvenile picked up dead by A. E. Bourguignon on the Ottawa River at Ottawa, Oct. 20, 1939. Also a live bird which was identified at Ottawa by C. H. Young on Nov. 21, 1923, and commented upon by others was quite possibly the one shot a week later at Rideau Lake.

9. *Phalacrocorax auritus auritus* (Lesson).

Eastern Double-crested Cormorant.— Fairly regular transient, especially in fall. The following dates are for specimens taken: Oct. 1 (approximately), 1890; Oct. 17, 1904; May 27, 1906; Oct. 20, 1918; Oct. 31, 1920; Oct. 15, 1921. Patch and Johnson report it at Shirley's Bay on Sept. 28, 1917; and on Nov. 5, 1924 E. G. White heard on reliable authority of a flock of twenty being seen at the Petrie Islands.

10. *Ardea herodias herodias* Linnaeus.

Eastern Great Blue Heron.— Common summer resident. Probably still breeds although the big heronies which early Ottawa naturalists ably described have disappeared from the vicinity of the city. One of these was visited by the Ottawa Natural History Society in 1868 and by the Ornithological and Oological Branch of the Ottawa Field-Naturalists' Club in 1882.

Spring arrival, (15 years' record): earliest date, Apr. 3, 1909; average date, Apr. 11. Fall departure, (13 years' record): latest date, Nov. 17, 1909: average date, Nov. 1.

There is in the literature an erroneous record of the occurrence of Casmerodius albus egretta (Gmelin), American Egret, at Ottawa, and this seems to be an opportune occasion to make a correction. In **Auk** li; 110; January 1885 the heading of a general note "The Great White Egret and the Yellow Rail in Ottawa, Canada." is incorrect. The note itself by W.L. Scott of Ottawa is essentially correct. In the first paragraph it records the taking in the spring of 1883 of a fine spring male from two seen of **Herodias egretta** at "Rockliffe" on the Ottawa River. The latitude and longitude of the place is recorded, and if we exchange the figures given for latitude and longitude we get the approximate place of capture. The specimen was said to be mounted and in the collection of the Geological and Natural History Survey of Canada. This record has been checked with E. G. White who tells me that there was a lot of discussion about this specimen at the time. He says that it was taken at Rockcliffe, now Stonecliffe, which is in Renfrew County on the main line of the C.P.R. about 130 miles northwest of Ottawa, hence far outside our district. McIlwraith, **Birds of Ontario**, 1894, p. 112, records the occurrence, although in stating that the pair was seen at "Rockcliffe on the Ottawa River" and the male is in the museum of the Geological Survey at Ottawa, he avoids the error in the **Auk** that the specimen was taken at Ottawa. Wells W. Cooke in his "Distribution and Migration of North American Herons and their Allies", 1913, repeats the occurrence at "Rockcliffe, Ontario" from McIlwraith. Rockcliffe, in Renfrew County, Ontario, where this bird was taken, is now Stonecliffe. Rockcliffe, known as such since about 1900, and officially as Rockcliffe Park since 1926, is an incorporated Village in Carleton County, Ontario, lying adjacent to Ottawa and east of it on the shores of the Ottawa River.

The Yellow Rail in the Auk heading mentioned above was not taken at Ottawa, as stated therein, but at Toronto, (Loronto) as shown in the text. The Yellow Rail error is inconsequential, because there are records for the Ottawa district, but there is no record of the American Egret for the Ottawa district. The Egret specimen, which is still in the National Museum, was taken at Rockcliffe, now Stonecliffe, Renfrew County, Ontario, and not at Rockcliffe Park, Carleton County, Ontario.

11. *Butorides virescens virescens* (Linnaeus). **Eastern Green Heron.**— A rare summer resident, somewhat commoner in fall, one breeding record. Specimens have been taken as follows: W. E. Saunders, Rideau River; E. G. White, May 17, 1913; one at Lochaber, Quebec, Sept. 7, 1918; P. A. Taverner, two at Kemptville Creek, July 15, 1918; Hoyes Lloyd, one at Hull, Quebec, Aug. 28, 1923. One was seen in the White's garden, on Aug. 11, 13, 1918; while Taverner and Patch saw one at the Petrie Islands Sept. 9 and 10, 1918. E. G. White reports that there was one in his garden on June 28 and 30, 1938. Taverner and Blakely took a nest with 5 eggs at Burritt's Rapids on the Rideau River, June 18,1918, the only breeding record for the vicinity.

12. *Nycticorax nycticorax hoactli* (Gmelin). **American Black-crowned Night Heron.**—Common summer resident; breeds. Every suitable habitat has its night herons, but they are easily overlooked because of their nocturnal habits. Early records include one shot by Robert Lett, Apr. 26, 1888, and five seen at McLaren's Bay, Aug. 8, 1888 (E. G. White, MS.). Two adult birds in the White collection, which is now in St. Patrick's College, Ottawa, were taken, Sept. 10, 1907. A juvenile specimen picked up dead by Giffard Johnson at Billings' Bridge, Oct. 30, 1933, was prepared as a mount for the Museum collection. D. Blakely says that these birds were accustomed to visit Dow's Swamp in flocks in fall. Recent clearing operations there may interfere with much of its interesting bird life, but Johnson reports that the birds, both juvenile and adults, are frequently seen along the Rideau River from August on, coming in to feed at dusk. G. R. White is authority for the statement in the 1891 list that young birds have been taken here in July, and Taverner and Blakely found the species at Kemptville Creek in mid-June and mid-July, 1918. Juveniles were taken at the Petrie Islands by Taverner and Patch, Aug. 30-31, 1918. It was common there then.

Spring arrival, (2 years' record): earliest, Apr. 18, 1894; average, Apr. 24. Fall departure, (9 years' record): latest, Oct. 27, 1894; average, Oct. 13.

13. *Botaurus lentiginosus* (Montagu). **American Bittern.**— Common summer resident; breeds. Found in marshy places, large or small; nests have been found at Lake Flora Swamp, Hull, Quebec, Aug. 1, 1882, with half-grown young; and at Moore's Landing, June 25, 1898. A. Wilson took 4 eggs at Patterson's Creek, now in Ottawa, May 25, 1900, specimen No. 694, National Museum collection; C. E. Johnson reports a nest with newly-hatched young at Leitrim, on June 8, 1929.

Spring arrival, (16 years' record): earliest, Apr. 16, 1897; average, Apr. 24. Fall departure, (16 years' record): latest, Nov. 2, 1896; average, Oct. 23.

14. *Ixobrychus exilis exilis* (Gmelin). **Eastern Least Bittern.**— Rare summer resident; breeds. G. R. White shot one in his garden, May 27, 1882; S. A. K. White secured

one at Lochaber, Quebec, Sept. 1, 1894; D. Blakely found the species at Hog's Back, Sept. 1917; P. A. Taverner saw the remains of a bird shot two miles below the mouth of the Lièvre on Sept. 8, 1918; C. E. Johnson reports one found dead at White Bridge on the Rideau, June 14, 1925, and states that he sees them frequently along the Rideau River, Ottawa South, in August; Burt Gresham and I found one at McKay's Lake, Rockcliffe Park. One in my collection was taken by R. F. Howard at Lochaber, Quebec, Sept. 29, 1935; one was noted at the Experimental Farm by E. G. White, June 16, 1940. It is believed that a pair bred at the Experimental Farm in 1898, and W. T. Macoun records the finding of a nest with eggs there in the summer of 1902, by F. A. Saunders. Taverner found it in mid-June, 1918, at the mouth of Kemptville Creek on the Rideau.

15. *Cygnus columbianus* (Ord).

Whistling Swan.— The nearest previous occurrence known was that of a flock seen at Westmeath in Nov., 1911, and identified by E. G. White. It is therefore of interest to record that A.E. Bourguignon found and captured an injured live bird in a pond at the mica mines, Chelsea, Quebec, Nov. 10, 1942. He kept it alive for a week, but it died, no doubt from wounds, for a .22 long rifle ball was found in its thigh when the specimen was being prepared for his collection. This is the first occurrence of the species in the Ottawa district.

16. *Branta canadensis canadensis* (Linnaeus).

Common Canada Goose.— Until recently a common transient spring and fall. As H. F. Lewis reminds me, the activities of large numbers of aircraft in the district have served to keep this species to very low numbers for several years past. Geese seem to be terrified of aircraft, and the presence of a practice bombing range at Lake Deschenes has interfered with the use of a favourite stopping place, where, in 1922, several hundred, in 1925 one thousand, and in 1929 two thousand, of the birds were accustomed to arrive in late March and spend a month or six weeks in the vicinity. The ice in the centre of the lake was used as a resting place and the birds flew inland to feed. The stay in fall was presumably not nearly so protracted. To judge from a specimen and the appearance of the birds in the Lake Deschenes flock, all are of this sub-species.

Spring arrival, (11 years' record): earliest, Mar. 20, 1903; average, Apr. 4.

17. *Branta bernicla hrota* (Müller).

American Brant.— Accidental, three records. One shot by P. Thompson near Thurso in the fall of 1887; two shot by Pierre Trudeau at Kettle Island about 1910; and one shot by J. Bedard from three seen at Thurso, Quebec, Oct. 20, 1907. The last mentioned specimen was preserved and was seen by E. G. White. E. G. White comments that about Nov. 1, 1938, a flock of approximately 75 small geese, said to be Brant, stayed near Thurso, Quebec, for some days, and, although several were reported to have been shot, he was unable to secure further information.

18. *Chen hyperborea hyperborea* (Pallas).

Lesser Snow Goose.— Rare transient. Three which were shot at Lochaber, Quebec, by G. R. White, Oct. 11, 1886, were all preserved. E. G. White states that a boy shot a white wild goose at Constance Bay on the Ottawa River in November 1926. G. R. White paddled C. H. Routh up to a Snow Goose at Lochaber, Quebec during the Fall of 1927. The bird was secured and was later seen by E.G. White at Montreal after it had been mounted. There are also a number of credible sight records reported fully in earlier lists as well as the following recent occurrences reported by E. G. White: on Oct. 10, 1936 two young Snow Geese were shot at Kars, one other remaining for several days; one was seen with a flock of Canada Geese at the same place, Apr. 15, 1937; on Apr. 18, 1937, Dr. Valin saw five at Cumberland; on Nov. 11, 1937, three were seen at Kars and one was shot; one came in with the captive Snow Geese at the Experimental Farm and remained for a few days prior to May 5, 1939.

19. *Chen caerulescens* (Linnaeus).

Blue Goose.— Accidental. Eugene Bedard shot two on Oct. 24, 1930 near Rockcliffe Airport, and on Oct. 25, 1930, saw seven at the Petrie Islands. Seven birds, presumably the same, were seen at Lochaber Bay during the same week. On Nov. 7, 1934 a juvenile bird joined the domestic geese at the Experimental Farm, Dow's Lake. It was easily driven under cover and wing-clipped on the 9th and E. G. White and I saw it on Nov. 15th. It was remarkably tame.

20. *Anas platyrhynchos platyrhynchos* Linnaeus.

Common Mallard.— Regular but uncommon transient. A specimen in my collection was taken by G. R. White at Lochaber, Quebec, Nov. 20, 1922, (a very late date).

Spring arrival: average, Mar. 27. Fall departure (9 years' record): latest, Nov. 14, 1904; average, Nov. 5 (once Nov. 20, see above).

21. *Anas rubripes* Brewster.

Black Duck.— Common summer resident; breeds. This is the commonest duck of the district and even in spite of the number taken by hunters seems able to hold its own fairly well. One was seen on the Christmas Bird Census, Dec. 21, 1941, by R. M. Anderson and others in the winter of 1942-44 by C. E. Johnson. An old breeding record tells of a nest and eggs being found at Pêche, Quebec, on May 21, 1881; F. Napier Smith[8] records it as nesting at Lochaber, Quebec, May 22-24, 1915; Taverner found young birds at Kemptville in July, 1918; and I have seen a nest and eggs at South March.

Spring arrival: earliest, Mar. 21, 1903; average, Apr. 14. Fall departure: latest, Nov. 21, 1902; average, Nov. 7 (see also winter date above).

22. *Chaulelasmus streperus* (Linnaeus).

Gadwall.— Accidental. One was shot on the Ottawa River from a flock of about one hundred by W. F. Whitcher. This specimen is in the White collection and is dated Oct. 30, 1885.

23. *Mareca penelope* (Linnaeus).

European Widgeon.—Accidental; three records. The first was a young male taken by G. R. White at Lochaber, Quebec, in the fall of 1926, probably October. On Oct. 27, 1934, Wm. Page shot a female at Fish Bay, Lochaber, Quebec; identification by E. G. White and Taverner. On November 3, 1934, H. Bedard of Rockcliffe Annex shot one at Dubee Island, Quebec, near Wendover, Ontario; identification by E. G. White.

24. *Mareca americana* (Gmelin).

Baldpate.— Regular uncommon transient. Specimen dates are Sept. 28, 1883, Thurso, Quebec; Oct. 22, 1921, Oct. 15, 1922.

Fall departure: latest, Nov. 6, 1930; average, Oct. 27.

8. —Can. Field-Nat., 36: 68, April, 1922.

25. *Dafila acuta tzitzihoa* (Vieillot).

American Pintail.— Fairly common transient, occurring in flocks of up to one hundred individuals. A specimen from one of these big flocks taken by S. A. K. White is dated May 2, 1888.

Average spring arrival date, Apr. 30.

26. *Nettion carolinense* (Gmelin).

Green-winged Teal.— Fairly common transient and uncommon resident. E. G. and G. R. White say that it breeds and that they have taken young birds on September first. Walter Heney reported two females with broods at Black Bay Marsh on Sept. 4, 1935; E. G. White saw several at Thurso, Quebec on May 11, 1941, a late date, if not nesting; he saw a female with five young, three-quarters grown, at Burritt's Rapids, on Sept. 21, 1941. Two specimens in local collections were taken by G. R. White at Lochaber, Quebec on Nov. 17, 1922.

27. *Querquedula discors* (Linnaeus).

Blue-winged Teal.— Common transient and occasional resident; breeds (G. R. and E. G. White). Specimen dates from the White collection are; Thurso, Quebec, Oct. 11, 1897, and Lochaber, Quebec, Sept. 3, 1922.

Fall departure, (8 years' record): latest, Oct. 27, 1894; average, Oct. 13.

28. *Spatula clypeata* (Linnaeus).

Shoveller.— Uncommon transient in fall. Specimens have been recorded as follows: fall of 1882; 1886; Oct. 5, 23, 1891; Sept. 16, 1908; Oct. 14, 1917, and Sept. 21, 1919. One was shot by Creighton Nash at Lochaber, Quebec on Nov. 10, 1922; two were found in the day's bag at Lochaber, Quebec, on Oct. 10, 1925, by E. G. White.

29. *Aix sponsa* (Linnaeus).

Wood Duck.— In the 1923 list recorded as "formerly a common migrant and summer resident which has become comparatively rare of late". Recently, a common transient and summer resident which has been noted abundantly, particularly in fall. Undoubtedly breeds, but data lacking.

Spring arrival, (15 years' record): earliest, Mar. 26, 1898; average, Apr. 22. Fall departure, (14 years' record): latest, Nov. 7, 1896; average, Oct. 27.

30. *Nyroca americana* (Eyton).

Redhead.— A regular fall transient, shot every year (E. G. and G. R. White).

31. *Nyroca collaris* (Donovan).

Ring-necked Duck.— Common transient; occurs in large flocks at the shooting marshes East of Ottawa on the Ottawa River and makes up an important part of the bag in October and November; numerous specimens in local collections. Two in my collection were taken at Lochaber, Quebec, Oct. 14, 1934.

Fall departure: latest, Nov. 21, 1892; average, Oct. 30.

32. *Nyroca valisineria* (Wilson).

Canvasback.— Regular transient in fall, occasional in spring (Merrickville, Feb. 13, 1925). Probably more common than formerly. E. Bernard shot four at Rockland, Ontario, in one day, Oct. 1921.

33. *Nyroca marila* (Linnaeus).

Greater Scaup Duck.— Common transient (E. G. and G. R. White). A specimen in the White collection was taken at Lochaber, Quebec, Oct. 31, 1893.

34. *Nyroca affinis* (Eyton).

Lesser Scaup Duck.— Common transient (E. G. and G. R. White). D. Blakely took two at Galetta on November 3, 1920, which are in the National Museum collection and there are many recorded captures.

Spring arrival: average, Apr. 26. Fall departure: latest, Nov. 12, 1894; average, Nov.5.

35. *Glaucionetta clangula americana* (Bonaparte).

American Golden-eye. — Common transient; regular winter resident ; occasional summer resident; breeds. Wintering birds, frequenting swift open water, are found every year, at the time of the Christmas Bird Census. G. R. White found a female with five young at Kettle Island, on June 23, 1894. A female with a fully developed egg was taken at Ottawa by E. G. White. F. Napier Smith[9] records it as nesting at Lochaber, Quebec, May 22-24, 1915. R. E. DeLury found a female with four half-grown young on the Ottawa River above Cumberland, Ontario, July 22, 1922.

Spring arrival: in twelve out of eighteen years first arrival not noted until April; average April 12; for 5 years first came in March and in 1885 first seen on February 14.

36. *Charitonetta albeola* (Linnaeus).

Buffle-head.— Moderately common transient (E. G. and G. R. White). A pair in the White collection was taken on the Rideau River, Apr. 23, 1886. I have a male which was drowned in a fish net, Apr. 21, 1937.

Spring arrival: earliest, Mar. 26, 1898; average, Apr. 24. Fall departure: average, Nov. 8.

37. *Clangula hyemalis* (Linnaeus).

Old-squaw.— Moderately common transient (E. G. and G. R. White). A pair in the White collection were shot on the Rideau River, May 17, 1887, and purchased by E. G. White.

38. *Somateria spectabilis* (Linnaeus).

King Eider. Irregular transient, sometimes occurring in considerable numbers. The first specimen was taken on the Ottawa River near the city by G. R. White, Nov. 7, 1889. There are several specimens in the White collection taken in 1908, when there was a considerable flight. On Nov. 15, 1920, Frank W. Bedard took two at Shirley's Bay which he presented to the National Museum. H. Burwash took a juvenile male at Shirley's Bay, Nov. 3, 1924, which was saved and brought to me because A. Workman recognized it. This specimen is also in the National Museum. Walter Heney shot two at Fish Bay near Masson, Quebec, in October 1937. Sam Hebert shot one near Cumberland, Nov. 14, 1937.

39. *Melanitta deglandi* (Bonaparte).

White-winged Scoter.— Common transient (E. G. White and G. R. White); mounted specimen in White collection was taken at Lochaber, Quebec, by G. R. White, Oct. 8, 1894.

40. *Melanitta perspicillata* (Linnaeus).

Surf Scoter.— Common transient (E. G. and G. R. White). The mounted pair in the White collection were shot on the Rideau Canal near the St. Louis Dam by Munzie, May 19, 1885.

41. *Oidemia americana* Swainson.

American Scoter. — Regular transient, sometimes occurring in considerable numbers (E.G. and G. R. White). They report more than 40 being shot from a single flock of adult males, one of which was purchased for their collec-

9. —Can. Field-Nat., 36:68, April, 1922.

tion. Their records give the date as Oct. 13, 1908. Eleven, including some males in fine plumage, were shot near Kemptville, about the middle of November, 1926, according to a report from E. G. White. One killed on the Rideau River at Kars, on Nov. 4, 1937, was given to E. G. White.

42. *Erismatura jamaicensis rubida* (Wilson).

Ruddy Duck.— Rare and irregular fall transient. On Oct. 22, 1878, G. R. White shot one, and on Oct. 12, 1896, he shot four at Rockland. E. G. White saw one shot, Oct. 28, 1906, and Eifrig records one taken, Oct. 15, 1907. There are early records of large numbers occurring in 1882 and 1887.

43. *Lophodytes cucullatus* (Linneaus).

Hooded Merganser.— Common transient and summer resident; breeds (E. G. and G. R. White). There are specimens in the White collection and in the National Museum. One was seen on the Rideau River at Hog's Back at the time of the Christmas Bird Census, Dec. 26, 1937, by R. E. DeLury.

Spring arrival: earliest, Mar. 21, 1903; average, Apr. 18.

44. *Mergus merganser americanus* Cassin.

American Common Merganser.— Common transient; occasional in winter; summer resident; breeds (E. G. and G. R. White). There are specimens in the National collection dated March, September, and November. E. G. White reports seeing twenty-five at Long Island, Rideau River, Apr. 28, 1940.

Spring arrival: average, Apr. 16. Fall departure: average, Nov. 21.

45. *Mergus serrator* Linnaeus.

Red-breasted Merganser.— Common transient and summer resident; breeds (E. G. and G. R. White). There are specimens in the White collection. Recent occurrences noted by E. G. White are 2 pairs in Rideau River, Apr. 25-26, 1940; and 3 males and 5 females at Booth Farm, May 12, 1940.

46. *Elanoides forficatus forficatus* (Linnaeus).

Swallow-tailed Kite.— Accidental; one record. This bird was perched on a flag-staff at the Rideau Rifle Range (now Strathcona Park), where it was examined closely through a good telescope by Lt. Colonel and Mr. G. R. White. The occurrence was prior to 1881.

47. *Astur atricapillus atricapillus* (Wilson).

Eastern Goshawk.— Fairly common but irregular transient, uncommon resident, breeds. Eifrig gives an account of an incursion of this species in the fall of 1906. He also tells of a battle to the death between an adult goshawk and a barred owl. F. C. Hennessey found a nest at Old Chelsea, Quebec, on May 16, 1912, and secured the adult and young for the National Museum collection.

48. *Accipiter velox velox* (Wilson).

Eastern Sharp-shinned Hawk. — Common summer resident; rare in winter; breeds. The wintering status has become clear of recent years by several records including: Christmas Bird census, 1921; Jan. 30, 1938, an adult female in the White's garden; and Jan. 13, 1939, one female in the White's garden. W. T. Macoun found it breeding in Dow's Swamp prior to 1903; Eifrig found fresh eggs June 30, 1909, and young birds, July 11, 1904; C. L. Patch reports a nest with young birds in July 1940 in a small swamp in Rockcliffe Park from which a newly-hatched juvenile was taken for the Museum on the 8th; E. G. White and Patch state that the birds nested in the same Rockcliffe locality in 1941 and had young birds in the nest in July. Johnson and Blakely also report it as nesting.

49. *Accipiter cooperi* (Bonaparte).

Cooper's Hawk. — Rare summer resident; breeds. Specimen dates are Apr. 18, 1885; Sept. 11, 1888; Aug. 29, 1903. One was received at the Museum, Oct. 6, 1940. E. G. White mentions Long Swamp, east of the Rockcliffe Rifle Range (now Rockcliffe Airport) as a nesting locality. John Arkell took a half-grown juvenile specimen at Brittania, July 6, 1928.

50. *Buteo borealis borealis* (Gmelin).

Eastern Red-tailed Hawk.— Moderately common transient and summer resident; presumably breeds. I have seen as many as fourteen of these birds in the air at once passing northwestward over the village of Rockcliffe Park in the spring.

51. *Buteo lineatus lineatus* (Gmelin).

Northern Red-shouldered Hawk.— Moderately common transient and summer resident; breeds. Taverner found it very common at the Petrie Islands at the end of August and beginning

of September, 1918, and took specimens there. I have two taken by E. G. White at Lochaber, Quebec, Sept. 19, 1925; they had been attacking his live decoy ducks. Another which I have, was shot by W. J. Taylor at Britannia on September 20, 1926, it having been killing and attacking domestic poultry. John Macoun and C. H. Young took a set of three eggs for the Museum near Hull, Quebec, on May 1, 1907. A nest with two eggs was found by a Club excursion near Hull, May 22, 1909. Taverner found a pair at Kemptville in mid-June, 1918. C. E. Johnson found a pair feeding young in the nest at Long Swamp, south of Ottawa, Apr. 13, 1925.

52. *Buteo platypterus platypterus* (Vieillot).

Broad-winged Hawk. — Moderately common summer resident; breeds. There are specimens in local collections. D. Blakely and C. L. Patch took a set of three eggs for the National Museum on May 27, 1918. I found a nest with three eggs near Hull, Quebec, May 9, 1925.

53. *Buteo swainsoni* Bonaparte.

Swainson's Hawk. —Accidental; one record. A live bird was donated to the National Museum on October 3, 1933, having been collected by L. Sotoriant at Bellview in the western environs of Ottawa, and it is now in the collection. This is the first known occurrence for the district.

54. *Buteo lagopus s.-johannis* (Gmelin).

American Rough-legged Hawk.— Rare and probably irregular transient; occasional in winter. C. H. Young noted it in winters of 1897-8 and 1899-1900. There are specimens in local collections and C. L. Patch took one for the National Museum at Black Rapids, the Rideau River, Nov. 9, 1926. Another specimen in the Museum collection was taken Dec. 9, 1938 by J. Cartier.

55. *Aquila chrysaëtos canadensis* (Linnaeus).

Golden Eagle. — A rare, casual visitor. One was taken Oct. 30, 1883 at Casselman, Ontario; a young bird at High Falls on the Lièvre, November 22, 1904; and one at Chelsea, Quebec, in the spring of 1922.

56. *Haliaeetus leucocephalus alascanus* Townsend.

Northern Bald Eagle.—A casual visitor, formerly bred here, and may do so yet. Specimens are taken from time to time. E. G. White saw one at Thurso, Quebec, July 20, 1941. An early account tells of a nest discovered at Pêche (Wakefield), Quebec, in May, 1881.

57. *Circus hudsonius* (Linnaeus).

Marsh Hawk.— Common summer resident; breeds. D. Blakely took a set of five eggs for the Museum collection near Ottawa, June 23, 1916.

58. *Pandion haliaëtus carolinensis* (Gmelin).

American Osprey.— Common transient; occurs in summer and presumably breeds. At the Petrie Islands Taverner found six at one time on September 9, 1918, and one specimen was taken. On September 17, 1924, C. E. Johnson observed one at Billings' Bridge which had taken a sucker there, and saw another at the same place, Apr. 30, 1926. About 1929 I saw an injured bird in captivity that had been taken in the vicinity of Billings' Bridge. The summer occurrence is reported by Taverner, who saw one at Kemptville on June 18, 1918.

59. (a) *Falco rusticolus candicans* Gmelin.

White Gyrfalcon.— Accidental; two records. G. R. White shot the first bird. The second was shot at Gatineau Point, Quebec, about 1903. The latter bird was photographed at the taxidermist's by E. G. White. The whereabouts of these two specimens is unknown.

(b) *Falco rusticolus obsoletus* Gmelin.

Black Gyrfalcon. — Accidental; one record. This is the specimen taken in the White's garden by E. G. White on December 23, 1890 and still in the White collection. The bird resembles *F. r. gyrfalco*, as shown in Fuertes' plate in the Birds of New York, which subspecies is now listed in the check-list under *obsoletus*.

60. *Falco peregrinus anatum* Bonaparte.

Peregrine Falcon. — Rare transient, occurs in summer and so may breed. E. G. White reports that one adult bird was seen over his garden, June 7, 1938, and another, June 25, 1940.

61. *Falco columbarius columbarius* Linnaeus.

Eastern Pigeon Hawk.— Uncommon transient and summer resident; occasional winter resident; breeds. E. G. White reports the following from his recent notes: 1938, one in garden, Feb. 10, 23, Apr. 8, one in town, Dec. 16; 1939, one in town, Mar. 20, one in garden,

Mar. 28, Dec. 31; 1940, one in garden, Jan. 30, Aug. 10; 1941, one at Parliament Hill, Apr. 4, one in city, June 29, one on Parliament Hill, Aug. 18, one in city, Dec. 27. I have one female which he collected Dec. 16, 1938. One was seen in Rockcliffe Park by me on the occasion of the Christmas Bird Census, December 26, 1931. Lewis and Smith [10] say that Taverner has an unrecorded account of a nesting at Low, Quebec. They also give a detailed account of a probable nesting in the City of Ottawa in May-June, 1936. Birds taken to the nest were identified from fragments as follows: tree swallow, chimney swift, bobolink, and junco.

62. *Falco sparverius sparverius* Linnaeus.

Eastern Sparrow Hawk.— Moderately common summer resident; rare in winter; breeds. One seen by E. G. White at Strathcona Park, Ottawa, Dec. 5, 1937, is an unusually late date and the species has been found on the Christmas Bird Census. Patch and Johnson took half-grown nestlings for the Museum on July 20, 1917. For several years after I moved to Rockcliffe Park in 1927, a pair occupied a huge basswood with a broken top that I could see from my dining room, and undoubtedly nested there. One was first noticed there on April 1, 1928.

63. *Canachites canadensis canace* (Linnaeus).

Canada Spruce Grouse— Formerly a common resident; undoubtedly bred. Now largely extirpated from the district, but occasional birds are to be expected wherever dense evergreen cover occurs.

64. *Bonasa umbellus togata* (Linnaeus).

Canada Ruffed Grouse. — Common resident wherever cover remains; breeds. Still occurs in the Village of Rockcliffe Park, the Experimental Farm, Ottawa South and the city proper. I have a bird which killed itself by flying against the National Museum. C. E. Johnson located a nest containing twelve eggs, on May 13, 1920, and I have found broods at Constance Lake and elsewhere. E. G. White and I found a nest with thirteen eggs at Stittville on May 24, 1922. A nest found by C. E. Johnson at Carlsbad Springs on May 25, 1933 contained three eggs, the start of the clutch. C. H. D. Clarke [11] records a nest found at Britannia Heights by Sheila Hoare on May 8, 1939, and visited by W. H. B. Hoare and Clarke, which contained eleven normal Ruffed Grouse eggs, one runt Grouse egg, and three normal Ring-necked Pheasant eggs.

65. *Perdix perdix perdix* (Linnaeus).

European Partridge. Hungarian Partridge. — Introduced. Resident where found. Some of the rather numerous introductions appear from the Museum records to have resulted in a limited number of birds surviving, at least for a time, and local hunters have reported finding them. Charles Taylor saw a flock of 25 birds near the Connaught Rifle Ranges in the winter of 1941-42 and heard reports of their being there the preceding year. These no doubt came from a number of birds which were released there in 1938. In April 1942 A. L. Rand saw two at the Arboretum, Experimental Farm. J. Skillen states that two flocks of at least twelve each were seen at Manotick in October 1942. P. E. Palmer reports that a covey of 15-20 birds was feeding about a haystack near Kemptville in January and February 1943. According to J. Skillen a large flock was reported near Hawthorne in October 1943. Fred Bourguignon took two from a flock of twenty-one at Kemptville during the last week of October 1943. Two or three birds were reported to Mr. Page as wintering near farm houses in the Kemptville-Merrickville area about January 1944. (A. L. Rand, Ms.).

66. *Phasianus colchicus torquatus* Gmelin.

Ring-necked Pheasant.— Introduced. Resident where found. The region is unsuitable for pheasants because of deep snowfall. Nevertheless a few manage to exist through the winter by frequenting market gardens, manure piles, or artificial feeding stations. Twenty-five were seen on the 1942 Christmas Bird census and H. F. Lewis considers that a moderate population survived the exceptionally severe winter of 1942-3.

67. *Rallus elegans elegans* Audubon.

King Rail.— Accidental; one record. One was shot at Billings' Bridge by May and specimen identified by G. R. White: also seen by Fleming.

68. *Rallus limicola limicola* Vieillot.

Virginia Rail.— Fairly common summer resident, breeds. D. Blakely reports having mounted a specimen taken at Ottawa South. A

10.—Can. Field-Nat., 53: 45-46, March, 1939.
11.—Can. Field-Nat., 53: 122-3, Nov. 1939.

late date is recorded concerning two which E. G. White found at Carp on October 15, 1903. Juveniles in the White collection were taken from a marsh on the Rideau River near their house. A. L. Garneau took a nest with nine eggs near the city on May 20, 1896, now in the National Museum. Eifrig found many young in the marsh at Osgoode on July 13, 1909.

Fall departure, (4 years' record): latest seen, Oct. 28, 1897; average, Oct. 6.

69. *Porzana carolina* (Linnaeus).

Sora.— Fairly common summer resident; breeds. There are young birds in the White collection. A. L. Garneau collected a nest with 12 eggs near the corner of Bank Street and Third Avenue on June 16, 1900, snaring the adult to insure correct identification. The set of eggs is in the National Museum. A nest, eggs and young were collected for the Museum by Patch and Lockwoood on June 17, 1929, in a marsh bordering McKay Lake not over 200 yards from my house.

Spring arrival, (6 years' record): earliest, May 8, 1910; average, May 11.

70. *Coturnicops noveboracensis* (Gmelin).

Yellow Rail.— Rare fall transient; known only from the observations of G. R. White. He secured specimens at Rockland, Ontario, Oct. 22, 1895, (1); and Oct. 20, 1909, (1). He reports seeing the species as follows at Rockland: in 1920, Sept. 1, (2), Sept. 6, (1), Oct. 10, (1); and in 1922, at Lochaber, Quebec (same vicinity) Oct. 8, (1).

71. *Gallinula chloropus cachinnans* Bangs.

Florida Gallinule.— Fairly common summer resident; breeds. The Whites say that it has been shot generally throughout the district. W. E. Saunders records the taking of a nest with seven partly-incubated eggs at Kars, July 9, 1890. Taverner found the species nesting at the mouth of Kemptville Creek in 1918; a nest in mid-June contained one young bird and three hatching eggs. E. G. White saw a sitting bird at Sabourin on June 8, 1925. R. E. DeLury states that they nest annually at the Experimental Farm.

72. *Fulica americana americana* Gmelin.

American Coot.— Casual summer resident and regular transient in fall; breeds, (E. G. and G. R. White). There are local specimens. G. R. White has found nests at Lochaber Bay.

Spring arrival, (3 years' record): earliest, Apr. 27, 1892; average, May 3. Fall departure, (5 years' record): latest, Oct. 23, 1909; average, Oct. 17.

73. *Charadrius semipalmatus* Bonaparte.

Semipalmated Plover.— Moderately common transient, spring and fall. A White collection specimen is dated September 23, 1890. Patch and Blakely have noticed it among the migrating shore birds at Britannia. Taverner and Patch found adult birds at the Petrie Islands, Aug. 28, 1918. A. E. Bourguignon took two at Britannia Bay, May 30, 1941, and one, June 4, 1941, the first spring specimens of which I am aware.

Fall departure, (5 years' record): latest seen, Sept. 29, 1885; average, Sept. 19.

74. *Oxyechus vociferus vociferus* (Linnaeus).

Killdeer.— Common transient and summer resident, breeds. Specimens in the White Collection are dated Apr. 2, 1884; Aug. 7, 1889; Apr. 18, 1904. C. E. Johnson and Patch took the eggs for a Museum group near Billings' Bridge on May 19, 1915. At the same place, Johnson records young not quite able to fly, June 3, 1931.

Spring arrival: earliest, Mar. 18, 1894; average, Apr. 17. Fall departure: latest, Oct. 16, 1905; average, Sept. 11.

75. *Pluvialis dominica dominica* (Müller).

American Golden Plover. — Formerly abundant, now rare fall transient. There was an immense flight about September 1, 1885, and no such flight since. There is a specimen dated September 22, 1884 in the White collection. On October 15, 1922 Creighton Nash shot one at Lochaber, Quebec: identified by G. R. White. Patch and Johnson found a flock of six at Britannia on October 8, 1923. One still in full breeding plumage was watched at close range for 25 minutes by A. E. Bourguignon at Graham Bay, Lake Deschenes, on Aug. 5, 1942. It was in company with 4 least sandpipers, 2 semipalmated sandpipers, and a black-bellied plover.

Fall departure: latest date, Oct. 31, 1906.

76. *Squatarola squatarola* (Linnaeus).

Black-bellied Plover. — Moderately common transient spring and fall. A. E. Bourguignon has taken three specimens at Graham Bay, Lake Deschenes, one each on June 12, 26, and Aug. 10, 1942. Fall specimens in local

collections have been mostly taken in October, although C. E. Johnson saw 4 at Galetta on Nov. 4, 1920.

Fall departure: latest, Nov. 8, 1903; average, Oct. 24.

77. *Arenaria interpres morinella* (Linnaeus).

Ruddy Turnstone.— Accidental; one record. H. F. Lewis (MS notes) saw one at Dow's Lake, May 23, 1943. During most of May of that year Dow's Lake and the Rideau Canal were drained, an unusual condition at that season, which exposed large areas of mud flats. The turnstone was seen under exceptionally good conditions on one of these flats beside the railway bridge where the canal enters Dow's Lake, Graham Cooch saw one, probably the same bird, at the same place the same day.

78. *Philohela minor* (Gmelin).

American Woodcock.— Common summer resident; breeds; occasionally abundant in fall migration. A pair nested in the White's garden in 1888. I have a fully grown young bird picked up dead at the Rockcliffe Rifle Ranges on June 16, 1920. Formerly a number of "singing birds" could be heard near my house every spring from early April on, but most of these have discontinued use of the nearby boggy woods, probably because of oiling activities for mosquito control.

Spring arrival: earliest, Apr. 20, 1890; average, May 1.

Fall departure: latest, Oct. 23, 1885; average, Oct. 19.

79. *Capella delicata* (Ord).

Wilson's Snipe.— Until recently an abundant transient and common summer resident; probably considerably depleted lately; breeds. I have one which was picked up dead by Leslie Stone at Rockcliffe Park on February 19, 1933. A good bag could be obtained within easy walking distance of the city in 1921. On Aug. 29, 1918, Taverner flushed more than fifty at the Petrie Islands. Usually one can be heard winnowing near McKay's Lake each spring. C. H. Young found a nest with 4 eggs in a wet field near Hurdman's Bridge, May 26, 1897, and there is a young bird from this nest, dated June 2, 1897, in the Museum collection. F. Napier Smith found a nest with 4 eggs near Lochaber, Quebec, May 24, 1915.

Spring arrival: earliest, April 12, 1902; average, Apr. 26. Fall departure: latest, Nov. 18, 1900; average, Nov. 2.

80. *Phaeopus hudsonicus* (Latham).

Hudsonian Curlew.— Probably an uncommon but more or less regular transient in fall about 1888, now rare. G. R. White used to find them where Strathcona Park is now located, and said they usually associated with the Golden Plover. He has taken about half a dozen specimens, three of which were during the great flight of Golden Plover in 1885. About the same time he saw T. G. Coursolles with two. A mounted bird in the White collection was taken at Strathcona Park in 1887. A. Workman shot a specimen near the city on Oct. 5, 1912 which was presented to the Museum. L. H. dePuyjalon, who knows the species well, reports seeing a flock of about fifty at Britannia on July 15, 1927.

81. *Bartramia longicauda* (Bechstein).

Upland Plover. — Rare summer resident; breeds. First observed in the district by E.G. White who saw two near Bourget, Ontario, on May 31, 1922, and two at the same place on August 6th. H. Groh[12] records that for three seasons since 1933 this species has frequented the J. R. Booth pastures near Shirley Bay, and one was once seen outside the Rifle Ranges at South March. E. G. White furnishes the following list of occurrences: 1 at Connaught Rifle Range, May 28, 1938; 1 at Booth Farm, May 12, 1940; 1 at Fallowfield, May 14, 1940; 2 at Hawthorne, June 20, 1940; 1 at Stittville, June 22, 1941. A. E. Bourguignon took one at Graham Bay, Lake Deschenes, on May 22, 1942. The first nesting for the district is that reported by John Carruthers, Crysler, Ontario (1932 addenda) who said that there were about two or three pairs in his vicinity and that he found a nest on his farm about 1925. The birds had been there for many years before that and he saw them every year up till the time of his report in 1930. E.V. Goodwill[13] discovered a nest with three, later four, eggs near Cyrville on May 31, 1940.

82. *Actitis macularia* (Linnaeus).

Spotted Sandpiper.— Abundant summer resident; breeds. The birds are to be found in all suitable localities throughout the summer and nests are frequently found even at some

12.—Can. Field-Nat., 50: 53, March, 1936
13.—Can. Field-Nat., 55: 133, Dec. 1941.

distance from the water. C. E. Johnson reports a nest with four eggs near the Rideau River on June 9, 1939.

Spring arrival: earliest, Apr. 24, 1897; average, Apr. 30. Fall departure: latest, Oct. 28, 1902 (also Nov. 16, 1903, E.G. White); average, Sept. 18.

83. *Tringa solitaria solitaria* Wilson.

Eastern Solitary Sandpiper.— Common transient spring and fall. There are specimens in the White and Museum collections. E. G. White found two adults with young two-thirds grown at Wilson's Pond, South March, in July 1905.

Spring arrival: earliest, May 2, 1896; average, May 11. Fall departure: latest, Oct. 31, 1906.

84. *Catoptrophorus semipalmatus inornatus* (Brewster).

Western Willet. Accidental. In this case the western sub-species is assumed on the basis of probability. A. E. Bourguignon, who has rapidly come to the fore as a close student of the local shore birds, saw three at Woodroffe, Ontario, on August 11, 1942, and although they seemed very nervous, he was able to observe them for several minutes. This is a new species for the Ottawa district.

85. *Totanus melanoleucus* (Gmelin).

Greater Yellow-legs. — Common transient, spring and fall; numerous specimens. A. E. Bourguignon has noted it at Graham Bay, Lake Deschenes, from May 1 to 15, in the years 1940 to 1943. Taverner and Patch found it common at the Petrie Islands, the end of August 1918.

Spring arrival: earliest, Apr. 28, 1905; average, May 9.

86. *Totanus flavipes* (Gmelin).

Lesser Yellow-legs.— Common transient, spring and fall. There are specimens in local collections. A. E. Bourguignon reports it at Graham Bay, Lake Deschenes, from May 1 to 15, from 1940 to 1943. Taverner and Patch found about 50 at one spot on the Ottawa, the end of August, 1918.

Fall departure: Oct. 18, 1901 (a late date).

87. *Calidris canutus rufus* (Wilson).

American Knot.— Very rare transient. E. G. White shot at least six on June 4, 1890, of which three are in the White collection and some in the Museum collection. N. H. Lett had one which was shot here by W. P. Lett, which is believed to be the basis for reporting the species in Ottawa Field-Nat. Club Trans. No. 4, p. 85, 1883. A. E. Bourguignon took four at Britannia Bay on May 30, 1941, and saw seven at Graham Bay, Lake Deschenes, on June 1, 1942.

88. *Arquatella maritima* (Brünnich).

Purple Sandpiper.— Accidental; one record. The specimen shot by W. Forbes on the Rideau River, Oct. 29, 1885, has been seen in the White collection.

89. *Pisobia melanotos* (Vieillot).

Pectoral Sandpiper.— Common transient. There are specimens in the White collection. One taken at Woodroffe, by A. E. Bourguignon, on Sept. 3, 1941, is the only one he has seen in several years of active study of the shore birds.

Fall departure: latest, Nov. 5, 1895: average, Oct. 29.

90. *Pisobia fuscicollis* (Vieillot).

White-rumped Sandpiper.— Uncommon transient. A considerable number of captures are noted in the early lists. G. R. White shot one Nov. 4, 1911; Philip Foran, another Oct. 8, 1921; and I found three and took one at Britannia, Nov. 1, 1922. The first spring specimen of which I have record is one taken at Britannia Bay, May 30, 1941 by Fred Bourguignon.

91. *Pisobia bairdi* (Coues).

Baird's Sandpiper.— Accidental; two records. A specimen was taken by G. R. White, Sept. 11, 1894, and is now in the White collection. One was taken by A. E. Bourguignon at Britannia, Sept. 2, 1941.

92. *Pisobia minutilla* (Vieillot).

Least Sandpiper.— A moderately common transient, spring and fall. There are specimens in local collections. A spring specimen in the Museum collection was taken May 14, 1934, by C. E. Johnson. A. E. Bourguignon took one at Wendover, May 17, 1939, and one at Beattie's Point, Lake Deschenes, May 28, 1941. E. G. White saw seven at Britannia Bay, July 6, 1941, an indication of the date when fall migrants should be looked for.

Spring arrival: earliest, May 10, 1888; average, May 18.

93. *Pelidna alpina sakhalina* (Vieillot).

Red-backed Sandpiper.— Rare transient, spring and fall. There are few local specimens. I took two at Britannia on Oct. 13, 1924. A. E. Bourguignon took one at Graham Bay, Lake Deschenes, May 25, 1942, and one at the same place, June 1, 1942.

Fall departure: latest, Oct. 29, 1889; average, Oct. 4.

94. *Limnodromus griseus griseus* (Gmelin).

Eastern Dowitcher.— Accidental. Three specimens were taken here in the Spring of 1890; one, May 9th by G. R. White, and two, May 22nd by E. G. White. One of these was examined in the White collection. A. E. Bourguignon observed one for fifteen minutes at ten yards, at Graham Bay, Lake Deschenes, May 22, 1942.

95. *Ereunetes pusillus* (Linnaeus).

Semipalmated Sandpiper.— Moderately common transient, spring and fall. There are specimens in local collections. A. E. Bourguignon took two, June 1, 1941, at Graham Bay, Lake Deschenes.

Fall departure: latest, Sept. 17, 1892; average Sept. 9.

96. *Tryngites subruficollis* (Vieillot).

Buff-breasted Sandpiper. — Accidental. One occurrence, Aug. 24, 1886, when E. G. White shot eight at Duck Island. One of these is in the White collection.

97. *Limosa fedoa* (Linnaeus).

Marbled Godwit.— Accidental; one record, a wounded bird captured alive at Britannia, about June 4, 1902, and seen by G. R. White at the taxidermist's.

98. *Limosa haemastica* (Linnaeus).

Hudsonian Godwit. — Probably a regular transient in fall, seventy years ago; recently very rare. G. R. White took specimens as follows: Sept. 21, 1874 (2); Oct. 16, 1876 (2); Oct. 17, 1876 (1); Oct. 11, 1897 (1); and a male changing to winter plumage, Oct. 20, 1900, the last one taken here. The 1897 specimen is in the White collection as well as one other.

99. *Crocethia alba* (Pallas).

Sanderling. — Moderately common transient. I have seen fall specimens only.

Fall departure: latest, Oct. 22, 1887.

100. *Phalaropus fulicarius* (Linnaeus).

Red Phalarope. — Rare transient, in fall. One was shot by E. G. White, Oct. 21, 1886, and one by G. R. White, Sept. 1, 1888. The latter specimen is in the White collection. The Whites also took single birds as follows: Sept. 1, 1885; Sept. 22, 1897; and Oct. 31 (year?).

101. *Lobipes lobatus* (Linnaeus).

Northern Phalarope.— Accidental; four specimens. One which had just been shot near Burritt's Rapids, Sept. 10, 1890, was obtained by A. G. Kingston; one was taken by E. G. White and one by G. R. White on Sept. 22, 1897, and both are in the White collection. G. R. White shot one at Kettle Island, Oct. 12, 1901.

102. *Stercorarius parasiticus* (Linnaeus).

Parasitic Jaeger.— Accidental; one record, a young bird shot Sept. 4, 1909, on the Ottawa River, at the mouth of the Lièvre, as recorded by Eifrig.

103. *Larus hyperboreus* Gunnerus.

Glaucous Gull.— Uncommon transient; chiefly in spring; one winter record. Eifrig gives dates based upon the observations of E. Bedard. E. G. White bought a freshly mounted specimen from Bedard. E. G. White has noted the species as follows: May 27, 1915, (1); Apr. 11, 1918 (1); May 12, 1918 (1); Spring 1919 (1); April 17, 1921 (2); and October 24 and 30, 1939; while G. R. White noted it on April 20, 1912 (2); and April 10, 1921 (1). E. V. Goodwill saw one on the Rideau River on December 23, 25, and 26, 1943; and this bird was also seen on the 26th by a Christmas Bird Census party composed of C. H. D. Clarke and J. A. Enstone. It was seen there again by Enstone in early February 1944, by Goodwill and Enstone on February 19th, and by Goodwill on February 26th. On this day at 5.05 p.m. it flew northward over Dow's Lake towards the Ottawa River, where it presumably spends the night.

104. *Larus marinus* Linnaeus.

Great Black-backed Gull. — Rare transient; no specimens taken to my knowledge. E. G. White remembers the one seen by G. R. White at Kettle Island, May 2, 1885. Eifrig records seeing one on April 9, 1906.

105. *Larus argentatus smithsonianus* Coues.

Herring Gull.— Common transient and summer resident; may breed. This species has increased decidedly during the past twenty years and is abundant at migration time, especially for a few weeks before freeze up in fall.

Spring arrival, (22 years' record): earliest, March 13, 1894; average, Apr. 4. Fall departure, (12 years' record): latest, Nov. 21, 1892; average, Nov. 7.

106. *Larus delawarensis* Ord.

Ring-billed Gull.— Rare transient. One was captured and kept alive in December 1908 by E. Bedard as recorded by Eifrig. E. G. White and I saw one at Sparks Rapids on the Rideau River, Nov. 12, 1934. C. L. Patch took a specimen for the National Museum at Lake Deschenes Oct. 1, 1935. On Nov. 9, 1941 E. G. White saw six with the Herring Gulls at Dow's Lake. H. F. Lewis saw two, one adult, one sub-adult near the Chaudière Falls of the Ottawa River, June 7, 1943; identified by size, plumage, and cries.

107. *Larus philadelphia* (Ord).

Bonaparte's Gull.— Fairly common transient, spring and fall. Local specimens have been taken June 9, 1885 and Sept. 26, 1917. Patch and Johnson saw eleven at Gatineau Point, May 16, 1918. Taverner and Patch saw one at Rockland, Sept. 8, 1918.

108. *Xema sabini* (Sabine).

Sabine's Gull.— Accidental; one record. E. G. White reports a young bird of the year shot by H. Bedard near mid-stream of the Ottawa River in the vicinity of Thurso, Quebec, Sept. 25, 1933.

109. *Sterna hirundo hirundo* Linnaeus.

Common Tern.— Fairly common transient; probably more numerous in fall. I have seen a specimen which was taken June 9, 1885.

110. *Hydroprogne caspia imperator* (Coues).

American Caspian Tern.— Accidental, one record, a bird seen by H. F. Lewis [14] in Ottawa South.

111. *Chlidonias nigra surinamensis* (Gmelin).

American Black Tern.— Rare summer resident; probably breeds. (E. G. White reports a nesting colony just outside our limits at Smiths Falls, June 22, 1941, and says that they spend the summer and probably nest between Burritt's Rapids and Merrickville). E. G. White took six on the Rideau River on May 28, 1888, some of which are in the White collection, and one in the Museum. On Aug. 31, 1918 Patch and Taverner saw one at the Petrie Islands. H. F. Lewis saw one at Dow's Lake, June 15, 1941.

112. *Uria lomvia lomvia* (Linnaeus).

Brünnich's Murre.— Irregular late fall transient; occasionally abundant. All known particulars of the strange fall flights of these birds at Ottawa have been recorded previously, and no flight has been reported since that which occurred in 1926. Why great flocks of these sea-birds should ever travel inland hundreds of miles from the sea remains a mystery.

113. *Columba livia livia* Gmelin.

Rock Dove.— Introduced and now resident. A limited number seem able to exist in the city in a feral state.

114. *Zenaidura macroura carolinensis* (Linnaeus).

Eastern Mourning Dove.— Moderately common summer resident; breeds. This species has increased greatly since its first occurrence in 1903 when one was seen at Shirley's Bay, by E. G. White. By 1908, Eifrig records seeing several and reports the shooting of a young bird at Dow's Swamp in 1910, the first breeding record. The increasing number of reports during the next decade indicate its steady progress in becoming established. On July 3, 1919, R. M. Anderson was advised of a nest at Britannia and went there to find an adult bird brooding two young, the first nest for the district. E. G. White has reported it as breeding regularly in Gloucester Township. C. E. Johnson gives the following dates for spring arrival at Long Swamp, south of Ottawa, Apr. 8, 1922; Apr. 29, 1923; and Mar. 29, 1925. On June 15, 1924 he banded two young that were then almost ready to leave the nest. He also found a nest with two eggs at South Gloucester, May 7, 1933; and another with two young ready to leave, at Leitrim, June 4, 1933.

115. *Ectopistes migratorius* (Linnaeus).

Passenger Pigeon.— Formerly a common summer resident which bred here; now extinct.

14.—Can. Field-Nat., 50: 92-3, May, 1936.

116. *Coccyzus americanus americanus* (Linnaeus).

Eastern Yellow-billed Cuckoo.— Very rare summer resident; breeds. A specimen taken by the Whites, June 27, 1890, is the only one I have seen from the district. That year a pair nested in the White's garden, the only breeding record.

117. *Coccyzus erythropthalmus* (Wilson).

Black-billed Cuckoo.— Fairly common summer resident; breeds. It is of rather secretive habits and often overlooked. W. T. Macoun (1903) reported that it had bred for several years at the Experimental Farm. D. Blakely took nestlings for the Museum collection, June 24, 1907. W. Anderson took three eggs near Cyrville, June 3, 1899, which are now in the Museum collection; and C. H. Young took a nest and two eggs at Meach's Lake, June 24, 1907 for the Museum. It nested in a beech hedge at my place in 1943.

Spring arrival, (25 years record): earliest, May 7, 1895; average, May 23. Fall departure, (13 years' record): latest, Sept. 16, 1890; average, Aug. 26.

118. *Tyto alba pratincola* (Bonaparte).

American Barn Owl. — Rare, breeds; 2 records. C. E. Johnson records the first occurrence at Ottawa, a bird captured alive near the city late in October 1933. To his son, Giffard Johnson, goes the credit for recognizing the bird and making the record possible. Jas. L. Baillie wrote me that the entomologist of the Royal Ontario Museum of Zoology, Fred Urquhart, saw two young not long out of the nest, in the summer of 1937 at Hawthorne.

119. *Otus asio naevius* (Gmelin).

Eastern Screech Owl.— Moderately common resident; breeds. There are specimens in local collections. C. E. Johnson has seen young birds between Billings' Bridge and Hog's Back in two separate years, and I found young birds in the possession of boys in Ottawa South, June 7, 1922. They nest in woods near my house and I have seen young birds in 1928, 1929 and other subsequent years. Broods are able to fly in June. On May 27, 1937 Johnson found a nest cavity near the Rideau River, Ottawa South, which contained the adult female and five small young.

120. *Bubo virginianus virginianus* (Gmelin).

Eastern Horned Owl.— Rather uncommon resident and winter visitor; probably breeds. This is believed to be the resident subspecies, although others doubtless occur, as I have seen two birds that were captured alive in the spring of 1922 which were dark enough to be *heterocnemis*. E. G. and G. R. White reported from their records a nest in a hemlock near De Rinzy's Greenhouse. Taverner saw one bird near Kemptville in mid-July, 1918.

121. *Nyctea nyctea* (Linnaeus).

Snowy Owl.— Irregular transient and winter resident. The greatest local flight occurred in the winter of 1901-2 when the local taxidermist received some three hundred specimens. A big flight also occurred in 1926-7. The Whites have taken specimens in 1890, 1902, 1906, and 1911.

122. *Surnia ulula caparoch* (Müller).

American Hawk Owl.— Uncommon and irregular winter resident; one probable breeding record. There are specimens in the White collection and I have one which E. G. White took at Stittville, Nov. 6, 1922. Harlan I. Smith and I saw one near Tenaga, Quebec, Dec. 24, 1922; and C. E. Johnson, one at Billings' Bridge, Dec. 8, 1923. W. J. Taylor took one at Britannia in the winter of 1925-6, and E. G. White saw one at Ellwood, six miles south of Ottawa, on Jan. 27, 1927. The presumptive breeding record is based upon the observations of F. Napier Smith who has published the complete record of a pair he saw at Lochaber, Quebec, May 22-24, 1915.

123. *Strix varia varia* Barton.

Northern Barred Owl.— Rather uncommon winter resident. Fall and winter occurrences make up the available record. DeLury tells of one at the Experimental Farm in the winter of 1929-30, where it killed numerous rats. Another at my residence caught a red squirrel. I saw one that trapped itself in a stable in Eastview. Fall and winter specimens have been seen in considerable numbers. I have one which was found dead at Rockcliffe Park on March 12, 1936, and another, taken at Beechwood Cemetery , Jan. 13, 1940.

124. *Scotiaptex nebulosa nebulosa* (Forster).

Great Gray Owl.— Rare and irregular winter visitor. The White specimen was taken, Apr. 3, 1896. Eifrig reports four in the winter of

1906-7. Patch and Johnson saw one at Constance Bay, Oct. 1, 1917. Two were shot at Tenaga, Quebec about the first of December, 1922, and I secured one of them. Other reports indicate a considerable flight that winter.

125. *Asio wilsonianus* (Lesson).

Long-eared Owl.— Uncommon transient in fall; rare summer resident; breeds. A few specimens have been taken in fall, and a single one in summer. The latter was secured by F. A. Saunders, July 7, 1890. Giffard Johnson picked up one on the roadway at Cameron and Bank Streets in Ottawa, Nov. 5, 1931. A small live downy juvenile was given to the National Museum by Weldon Prendergast, of Navan, Ontario, June 7, 1931, the first definite breeding record for the district. This bird was given to me to raise and we succeeded as foster-parents in rearing it to be released a full-sized bird, strong of wing.

126. *Asio flammeus flammeus* (Pontoppidan).

Short-eared Owl.— Uncommon and irregular transient in fall. There are a good many local specimens most of which have been taken in autumn.

127. *Cryptoglaux funerea richardsoni* (Bonaparte).

Richardson's Owl.— Rare winter visitor. The Whites took specimens as follows: Jan. 1, 1884; Nov. 29, 1884; Dec. 17, 1903. Eifrig records one said to have been shot here, Nov. 16, 1906. A dead bird was brought to R. E. DeLury in December 1922, and I collected one at Hull, Quebec, Feb. 18, 1923. There was apparently a flight during the fall of 1922. H. F. Lewis and I saw a captive one alive, Mar. 17, 1925. It had flown into an office of the Department of Finance, East Block, Parliament Buildings, and was banded and released.

128. *Cryptoglaux acadica acadica* (Gmelin).

Eastern Saw-whet Owl.— Moderately common resident; rare in summer; breeds. Specimens have been noted as follows; Mar. 9, 1885; July 14, 1885; Feb. 9, 1887; Jan. 18, 1896; Oct. 11, 1920 (all by Whites); June 27, 1921 (Blakely). The last, a young bird taken on Bay Street, Ottawa, is in the typical juvenile plumage which lasts but a short time. Near their residence, the Whites once took a bird alive which was in this plumage. I have one which was found dead at Britannia, Feb. 23, 1939, by Allan Bruce. Another was seen on the window shelf of my home feeding station, Mar. 7, 1942. Eifrig found a female, Apr. 11, 1901 in the oviduct of which was a fully developed egg.

129. *Antrostomus vociferus vociferus* (Wilson).

Eastern Whip-poor-will.— Moderately common summer resident; breeds. H. F. Lewis found it common in summer in suitable sandy or rocky areas as east of Vars, and west of Stittville. D. Blakely took a set of eggs for the Museum, June 2, 1916. C. E. Johnson reports finding two eggs at the Mer Bleue, June 14, 1931.

Spring arrival, (32 years' record): earliest, Apr. 25, 1885; average, May 17. Fall departure, (20 years' record): latest, Oct, 16, 1909; average, Sept. 11.

130. *Chordeiles minor minor* (Forster).

Eastern Nighthawk.— Common summer resident; breeds. Taverner found it uncommon away from the city in his studies along the Rideau waterway in 1918. I have observed it nesting on the roof of the Parliament Buildings and elsewhere in the city. Nested on the roof of the Museum June 29, 1917.

Spring arrival, (36 years' record): earliest, May 9, 1895; average, May 18. Fall departure, (30 years' record): latest, Sept. 23, 1892; average, Sept. 4.

131. *Chaetura pelagica* (Linnaeus).

Chimney Swift.— Common summer resident; breeds. Flocks still perform aerial manoeuvers over the city, utilizing of late years the chimneys of several churches in the Glebe. A. G. Kingston's life history observations on the Chimney Swift in the Ottawa Naturalist, Volume 5, are well worth reading. A set of four eggs in the Museum was taken by H. H. Selwyn, at Kirk's Ferry, Quebec, July 13, 1903. C. E. Johnson could hear young birds being fed in the nest in a chimney of his residence, Ottawa South, July 15, 1938.

Spring arrival, (36 years' record): earliest, Apr. 22, 1897; average, May 4. Fall departure, (30 years' record): latest, Oct. 3, 1906; average, Aug. 29.

132. *Archilochus colubris* (Linnaeus).

Ruby-throated Hummingbird.— Common summer resident; breeds. Our only hummingbird is surely known to almost every one. A nest

found by W. E. and F. A. Saunders on July 12, 1890 contained fresh eggs.

Spring arrival, (35 years' record): earliest, May 5, 1908; average, May 16. Fall departure, (27 years' record): latest seen, Oct. 16, 1909; average, Sept. 14.

133. *Megaceryle alcyon alcyon* (Linnaeus).

Eastern Belted Kingfisher.— Common summer resident; breeds. Patch and Johnson found a nest at Black Rapids, June 5, 1918, which contained seven young.

Spring arrival, (46 years' record): earliest, Apr. 5, 1892; average, Apr. 18. Fall departure, (42 years' record): latest, Nov. 26, 1885; average, Oct. 13.

134. *Colaptes auratus luteus* Bangs.

Northern Flicker.— Common summer resident; breeds. A hybrid, *auratus* x *cafer*, having a red undertail surface, and yellow elsewhere as in *auratus*, was seen at the Experimental Farm on May 12, 1936, by A. D. Nelles[15]. Nesting dates have been furnished by C. E. Johnson as follows: six eggs, Ottawa South, June 18, 1933; young birds, Ottawa South, June 4, 1933.

Spring arrival, (42 years' record): earliest, Mar. 26, 1907; average, Apr. 16. Fall departure, (35 years' record): latest, Dec. 1, 1918; average, Sept. 30.

135. *Ceophloeus pileatus abieticola* Bangs.

Northern Pileated Woodpecker.— Rare resident; breeds. All specimens of which I am aware are fall and winter ones. Rather extensive cutting of hardwoods for fuel is depriving some local birds of their habitat. Individuals have visited our home woods on at least three occasons, the latest one being on October 24, 1940. E. G. White found a nest in South March in 1922, and Taverner reports the finding of a nest at King's Mountain, which was collected for a museum group. It is not known that this nest was occupied. H. F. Lewis found one excavating a cavity in a dead yellow birch at South March, Apr. 28, 1943.

136. *Melanerpes erythrocephalus* (Linnaeus).

Red-headed Woodpecker.— Very rare summer resident; breeds. Although never common, this species has decreased here greatly in recent years. During the summer of 1922 E. G. White and I found a pair near the Rideau River, while others were seen by me at Rivermead, five miles west of Hull, Quebec, and one in the grounds of Rideau Hall. C. E. Johnson found an occupied nest at Rideau Park, June 3, 1922; and on July 16, 1923, three miles south of Ottawa on the C. P. Railway line he banded three fledglings which were then about ready to leave the nest. Alice and William Lanceley have recorded that a pair of adults brought two juveniles to their feeding station, during the summer of 1927, at Lindenlea, Ottawa. R. E. DeLury states that a pair nested near his home for two or three summers prior to 1930. He has banded the old ones and some young which they brought to the feeding station.

Spring arrival, (24 years' record): earliest, Apr. 26, 1904; average, May 18. Fall departure, (15 years' record): latest, Sept. 18, 1897; average, Sept. 1.

137. *Sphyrapicus varius varius* Linnaeus.

Eastern Yellow-bellied Sapsucker.— Abundant transient; common summer resident; breeds. Nests have been found by F. A. Saunders, June 15 and 24; by Eifrig; and by Patch, at Rockcliffe, during 1921 and 1922.

Spring arrival, (44 years' record): earliest, Mar. 31, 1907; average, April 15. Fall departure, (30 years' record): latest, Oct. 16, 1909; average, Sept. 22.

138. *Dryobates villosus villosus* (Linnaeus).

Eastern Hairy Woodpecker.— Fairly common resident; breeds; probably a limited migration occurs spring and fall. Specimens from 1884 to 1921 are all referred to this subspecies. C. E. Johnson found a nest containing young on May 24, 1921 from which the last two young left on June 3rd. Adult birds bring their newly-fledged young to my home feeding station almost every summer. A large juvenile was being fed suet there by a male bird on July 16, 1940.

139. *Dryobates pubescens medianus* (Swainson).

Northern Downy Woodpecker.— Common resident; breeds; more numerous at migration time. Johnson, Patch and Young took a nest and five eggs near the Rideau River on May 6, 1915, for the exhibition group at the National Museum.

15.—Can. Field-Nat., 51: 45, March 1937.

140. *Picoides arcticus* (Swainson).

Arctic Three-toed Woodpecker.— Uncommon resident, more frequent in winter; probably breeds. There are specimens in local collections. Eifrig found it at Inlet, Quebec (about twelve miles north of Thurso), June 14, 1905, and it probably breeds in the northern fringe of our district. R. E. DeLury saw one at the Experimental Farm, Aug. 28, 1922. I have seen it in my garden in spring and C. E. Johnson noted one at South Gloucester, May 7, 1933. Most other local observations are in winter.

141. *Picoides tridactylus bacatus* Bangs.

Eastern American Three-toed Woodpecker.— Rare transient and winter resident. One was seen by C. E. Johnson at Leitrim on April 21, 1934. All specimens of which I am aware have been taken in fall. G. H. Hammond and T. S. Hennessy[16] found one at Aylmer, Quebec on the Christmas Bird Census, December 21, 1941.

142. *Tyrannus tyrannus* (Linnaeus).

Eastern Kingbird. — Common summer resident; breeds. L. M. Lambe took a set of five eggs for the National Museum, at Aylmer, Quebec, June 15, 1889. I saw a nest near King's Mountain, June 3, 1919, and noticed a bird building at Black Rapids, June 4, 1921.

Spring arrival, (19 years' record): earliest, May 3, 1896; average, May 9. Fall departure, (10 years' record): latest, Aug. 29, 1896; average, Aug. 26.

143. *Myiarchus crinitus boreus* Bangs.

Northern Crested Flycatcher.— Moderately common summer resident; breeds. It has nested in a bird-box in Taverner's garden. Nest with six eggs was taken for the National Museum, at Eastman's Springs by C. H. Young, June 11, 1908. Eifrig gives a nesting occurrence at Blueberry Point, June 12, 1909.

Spring arrival, (18 years' record): earliest, May 5, 1902; average, May 13. Fall departure, (4 years' record): latest, Sept. 10, 1893; average, Aug. 26.

144. *Sayornis phoebe* (Latham).

Eastern Pheobe.— Common summer resident; breeds. Eifrig records nest with eggs May 14th, and C. E. Johnson found a nest with large young, May 24, 1921.

Spring arrival, (17 years' record): earliest, Mar. 26, 1907; average, Apr. 7. Fall departure, (9 years' record): latest, Oct. 10, 1905; average, Oct. 2.

145. *Empidonax flaviventris* (Baird and Baird).

Yellow-bellied Flycatcher.— Uncommon summer resident; breeds. E. G. White took one on May 26, 1884. Nests with young are recorded as found in the Mer Bleue by F. A. Saunders, June 15, 1898, and another, also with young, at King's Mountain, June 24, 1898.

Spring arrival, (6 years' record): earliest, May 19, 1906; average, May 23.

146. *Empidonax trailli trailli* (Audubon).

Alder Flycatcher.— Common summer resident; breeds. At Dow's Swamp, July 6, 1926 C. E. Johnson took a bird, nest, and eggs for a National Museum group, and this is apparently the first and only definite breeding record.

Spring arrival, (9 years' record): earliest date, May 14, 1905; average, May 24. Fall departure: Sept. 4, 1905.

147. *Empidonax minimus* (Baird and Baird).

Least Flycatcher.— Common summer resident; breeds. C. H. Young found five nests, June 3, 1911, at Meach's Lake, Quebec, of which one with four eggs was taken for the National Museum collection.

Spring arrival, (17 years' record): earliest, May 5, 1905; average, May 13. Fall departure; latest, Aug. 30, 1888; average, Aug. 22.

148. *Myiochanes virens* (Linnaeus).

Eastern Wood Pewee.— Common summer resident; breeds. It is often found in the heart of the city. A nest with two eggs taken by A. G. Kingston in June 1892 is in the National Museum collection. A young bird was being fed by the parent at my place on July 28, 1940.

149. *Nuttallornis mesoleucus* (Lichtenstein).

Olive-sided Flycatcher.— Uncommon transient and summer resident; presumed to breed. I have noted it at Village of Rockcliffe Park; at Aylmer, Quebec, July 16, 1922, and at Crown Point on the Ottawa River, June 9, 1940.

16.—Can. Field-Nat., 56: 26-7, Feb. 1942.

150. (a) *Otocoris alpestris hoyti* Bishop.

Hoyt's Horned Lark.— Transient. Two specimens in the White collection are assigned to this sub-species; one was taken on May 2, 1890 during a migration of *O. a. alpestris*, the other was taken on March 31, 1897.

(b) *Otocoris alpestris alpestris* (Linnaeus).

Northern Horned Lark.— Casual transient. It was found in numbers at the Experimental Farm in the spring and fall of 1890. The following specimens were taken that year: White collection, May 2nd (1), May 6th (1), J. A. Fletcher; Fleming collection, April 1st (1), Sept. 27th (1), Oct. 6th (1), Oct. 11th (1), F. A. Saunders. In 1895 E. G. White secured a single bird at the Rifle Ranges, April 29th.

Spring: arrival, Apr. 19; departure, May 25. Fall: arrival, Sept. 26; departure, Oct. 28. (1 year's record).

(c) *Otocoris alpestris praticola* Henshaw.

Prairie Horned Lark.— Common transient and summer resident; breeds. H. F. Lewis advises me that it commonly arrives in February. He saw seven near North Gower, February 13, 1937. In 1937 I left Ottawa by motor car on February 26th and travelled south to Prescott, Ontario, and beyond in New York State. These birds were passing northward in thousands and were noticed in flocks by the roadside from about Kemptville, Ontario to Mexico, New York. Eifrig gives the earliest breeding date as March 28th. C. H. Young took a nest with four eggs for the National Museum collection at Hurdman's Bridge, on April 11, 1900.

Fall departure, (8 years' record): latest, Nov. 11, 1898; average, Oct. 24.

151. *Iridoprocne bicolor* (Vieillot).

Tree Swallow.— Abundant transient and summer resident; breeds. May arrive so early that unseasonable weather destroys large numbers. Taverner and I consider that the 1928 migration met disaster. That year the birds came early, and after their arrival the district had two severe cold spells with snow. There is a nest with six eggs in the National Museum collection taken, June 6, 1908, at Meach's Lake, Quebec. I have a record of young leaving the nest, June 30, 1922. C. E. Johnson reports a nest with six eggs in a fence-post at Ottawa South, May 28, 1932.

Spring arrival, (33 years' record): earliest, Mar. 28, 1897; average, Apr. 10. Fall departure, (20 years' record): latest, Sept. 6, 1887; average, Aug. 9.

152. *Riparia riparia riparia* (Linnaeus).

Bank Swallow.— Common summer resident; breeds. Colonies are found in suitable sand banks throughout the district; and a 1921 excursion found a colony in saw-dust banks at Aylmer, Quebec.

Spring arrival, (31 years' record): earliest, (August) = April 29, 1912; average, May 11. Fall departure, (24 years' record): latest, Sept. 15, 1911; average, Aug. 26.

153. *Stelgidopteryx ruficollis serripennis* (Audubon).

Rough-winged Swallow.— Rare summer resident, breeds. C. L. Patch was the first observer to find this species at Ottawa. On June 28, 1917 he found two pairs nesting on the banks of the Rideau River, only a few miles south of the city, and on June 5, 1918 he found a nest with six eggs in the same locality. H. F. Lewis[17] records seeing two at Dow's Lake on May 10 and 11, 1938. In 1940 and 1941 he saw a pair there, and they were seen to enter a drainage hole in the cement wall of the canal. In 1942 he saw four there, and on June 21st, a family of young birds. Adults were entering and leaving drainage holes as if caring for young. In 1943 the canal was empty in May and more drainage holes were exposed than is usually the case. Twelve individual Rough-wings were counted by him between Hog's Back and Bank Street on May 23rd. To sum up, it seems that several pairs are now nesting regularly in the Dow's Lake area.

154. *Hirundo erythrogaster* Boddaert.

Barn Swallow.— Common summer resident; breeds. Eifrig records nests at Carp, Ontario, May 29, 1909; one with seven eggs, and two with two.

Spring arrival, (29 years' record): earliest, Apr. 17, 1909; average, Apr. 26. Fall departure, (28 years' record): latest, Sept. 29, 1910; average, Sept. 6.

155. *Petrochelidon albifrons albifrons* (Rafinesque).

Northern Cliff Swallow.— Uncommon summer resident; irregularly distributed; breeds. Barns

17.—Can. Field-Nat., 52: 123, Nov. 1938.

that once had scores of nests are recorded in the 1923 list as having one or two. In 1922 I found two places where from one to three pairs were nesting, and Johnson, Blakely, and Patch reported another. In the 1930 "addenda" additional small colonies are recorded, including an account of an attempted nesting on a house in Ottawa South, which failed because the nests were destroyed by the property owner. A. L. Rand reports an attempted nesting there in 1942. On May 27, 1943, H. F. Lewis observed one pair working on the foundation of a nest near Aylmer, Quebec.

Spring arrival, (30 years' record): earliest, Apr. 21, 1888; average, May 9. Fall departure, (25 years' record): latest, Sept. 30, 1908; average, Sept. 6.

156. *Progne subis subis* (Linnaeus).

Eastern Purple Martin.— Common summer resident: breeds. There are numerous colonies in Ottawa. The earliest date of arrival for the Taverner colony is a male which came back on April 7, 1922. Full grown young were banded by me at a local colony on July 26, 1922.

Spring arrival, (32 years' record): earliest, Apr. 13, 1909; average, Apr. 24. Fall departure, (26 years' record): latest, Sept. 12, 1907; average, Aug 21.

157. *Perisoreus canadensis canadensis* (Linnaeus).

Eastern Canada Jay.— Irregular winter visitor; in some years fairly numerous. One came to my home feeding station on November 11, 1929 and was a regular caller for about a month. B. A. Fauvel and I saw two at Templeton, Quebec, Dec. 22, 1929; on April 18, 1930 one visited our home feeding station. H. F. Lewis reports a flight in the fall of 1941 when he saw at Stittville, Sept. 26th (1), at White Bridge, Oct. 2nd (1), at Ottawa South, Oct. 4th (4), at Manotick, Oct. 9th (1), at South March, Dec. 26th (2). A specimen from this migration was taken by D. J. Blakely, Oct. 8, 1941.

158. *Cyanocitta cristata cristata* (Linnaeus).

Northern Blue Jay.— Moderately common resident; breeds. Definite flights occur and are most noticeable in fall. E. G. White reports such a flight at Lochaber, Quebec, in October 1936, at which time there was a good crop of acorns. In May 1911, C. H. Young found a nest with four half-grown young birds at Meach's Lake, Quebec.

Spring arrival, (5 years' record): earliest, Jan. 5, 1909; average, Feb. 9. Fall departure: latest, Dec. 1, 1885.

159. *Corvus corax principalis* Ridgway.

Northern Raven.— Rare resident; formerly occurred in the city. The Whites have secured specimens at Rockland. I have one taken by hunters at Battle Lake, seven miles north east of Perkins Mills, Quebec (lot 5 range 13 Templeton), Nov. 17, 1935. It came into my hands through Mr. Humphrey of the C. N. Railway and is evidence that the bird persists in the remoter parts of the district.

160. *Corvus brachyrhynchos brachyrhynchos* Brehm.

Eastern Crow.— Abundant summer resident; breeds. The 1923 list records that the crow did not winter here in former years according to G. R. White. At that time they had begun to winter in numbers and it is said that the wintering flock at Ottawa South in 1921-22 numbered about two hundred. In the Christmas census of 1934 about five hundred are recorded. H. F. Lewis calls attention to the fact that the number wintering in recent years has been much less; in 1943 it was unrecorded. No cause for the reduction is known. Crows nested on Parliament Hill in April 1906. C. E. Johnson reports young of the year out of the nest and flying at the Mer Bleue and Carlsbad Springs, June 3, 1943.

Spring arrival, (31 years' record): earliest, Jan. 1, 1894; average, Feb. 21. Fall departure, (16 years' record); average, Nov. 4; rare in winter.

161. *Penthestes atricapillus atricapillus* (Linnaeus).

Eastern Chickadee.— Common resident and abundant transient; breeds. G. R. White and Norman Lett found a nest with young at Chelsea, Quebec, May 26, 1894. C. H. Young took a nest with six eggs for the National Museum, near Eastman's Springs, June 1, 1908.

162. *Penthestes hudsonicus hudsonicus* (Forster).

Hudsonian Chickadee.— Rare fall transient and winter visitor; most records are in fall. I saw one at Rockcliffe Park, Dec. 21, 1941. H. F. Lewis reports one in Dow's Swamp,

Oct. 31, 1943, and two near Galetta, Nov. 12, 1943.

163. *Sitta carolinensis carolinensis* Latham.

White-breasted Nuthatch.— Moderately common resident; breeds. They come to our feeding station every month of the year. The nest and eleven eggs in the National Museum group were taken near Billings' Bridge by Taverner and Young, May 19, 1911.

164. *Sitta canadensis* Linnaeus.

Red-breasted Nuthatch.— Moderately common spring and fall transient; uncommon winter and summer resident; presumably breeds; prefers evergreen woods, but spring and fall migrants are found in city shade trees and otherwise away from the usual habitat. Dr. Bruce Kennedy gave me one which was picked up dead in the city, Oct. 4, 1943. Macnamara[18] records a nesting at Lowney's Lake, ten miles south of Arnprior, and just outside our district.

165. *Certhia familiaris americana* Bonaparte.

Eastern Brown Creeper.— Common transient, spring and fall; rather rare summer and winter resident; presumably breeds. F. A. Saunders found it at Kazubazua, Quebec, July 3, 1898.

Spring arrival, (8 years' record): earliest, Feb. 18, 1885; average, Apr. 13. Fall departure: latest, Dec. 8, 1883.

166. *Troglodytes aedon aedon* Vieillot.

Eastern House Wren.— Common summer resident; breeds. Nests in bird boxes and natural cavities throughout the district, including the city.

167. *Nannus hiemalis hiemalis* (Vieillot).

Eastern Winter Wren.— Fairly common transient spring and fall; uncommon in summer; probably breeds. It is recorded from Dow's Swamp in June 1898 by F. A. Saunders; has been found in suitable localities in summer and will presumably be found nesting.

168. *Telmatodytes palustris palustris* (Wilson).

Eastern Marsh Wren.— Common summer resident; breeds. It is to be expected only in suitable marshes, as at Kemptville, where Taverner secured specimens in 1918. A set of six eggs in the National Museum collection was taken by W. E. Saunders at the Experimental Farm, June 13, 1898. A nest was collected for the Museum near Billings' Bridge, Aug. 8, 1934, by C. E. Johnson.

169. *Cistothorus stellaris* (Naumann).

Short-billed Marsh Wren.— Probably a very rare summer resident. There are about three records. A specimen taken by F. A. Saunders at the Mer Bleue on June 17, 1898 is in the National Museum collection. Two birds were seen there. Eifrig records the capture of another there, June 16, 1905. A. G. Lawrence and I found a singing male in the Village of Rockcliffe Park, June 16, 1929.

170. *Dumetella carolinensis* (Linnaeus).

Catbird.— Common summer resident; breeds. Nests in my shrubbery almost every year. Young just from the nest were found at Aylmer, Quebec, on July 16, 1922.

171. *Toxostoma rufum* (Linnaeus).

Brown Thrasher.— Moderately common summer resident; breeds. A favourite place for these birds is the arboretum at the Experimental Farm. On June 18, 1884, the Whites found a nest at Beechwood which contained three thrasher eggs and one of the cowbird. Another nest at the Experimental Farm is reported for June 16, 1898.

172. *Turdus migratorius migratorius* Linnaeus.

Eastern Robin.- Abundant summer resident; rare winter resident; breeds. Winter records up to Christmas are fairly numerous. I saw one near the Printing Bureau on December 15, 1918. Found fairly frequently at the time of the Christmas Bird census, as in 1921 and 1922. Eifrig reports that four birds which wintered near the City Hall from December 21, 1908, to March 4, 1909, were no doubt frozen to death by one of the few short cold spells which occurred during the winter, and this is the probable fate of most wintering Robins. R. E. DeLury had one bird of several survive safely when cared for at his feeding station. Every morning for a couple of weeks after January 14, 1925, including one day when the temperature was thirty degrees below zero F., one came to a feeding station operated by Mrs. R. D. Brown. The food provided was mountain ash berries. At the Experimental Farm where they occur nearly every winter they swallow whole frozen crabapples one half inch in diameter. They breed everywhere throughout the district.

18.—Can. Field-Nat., 53: 33-34, March, 1939.

Spring arrival, (15 years' record): earliest, Jan. 9, 1894; average, Mar. 23. Fall departure, (14 years' record): latest, Nov. 29, 1888; average, Nov. 12.

173. *Hylocichla mustelina* (Gmelin).

Wood Thrush.— Rather rare summer resident; occurs in a limited number of localities, breeds. There is a specimen in the White collection taken May 14, 1889. F. A. Saunders reports one or two pairs breeding on the southern face of King's Mountain. Present every summer since 1927 near my home in Rockcliffe Park. William Bell showed me a nest with four eggs near my house, June 12, 1928. On June 27th the young flew, and on July 1st the same nest contained one punctured egg. Robert Lockwood found another nest with four eggs in a sapling ten feet from the ground at Rockcliffe Park, June 9, 1929. There are about three singing males in the colony near my home, perhaps fewer some years.

Spring arrival, (6 years' record): earliest, May 6, 1905; average, May 10.

174. *Hylocichla guttata faxoni* Bangs and Penard.

Eastern Hermit Thrush.— Common transient, spring and fall; rather uncommon summer resident; probably breeds. I took a male bird at King's Mountain, July 1, 1922. C. E. Johnson has observed birds with building material in their bills at Rideau Park.

Spring arrival, (13 years' record): earliest, Apr. 8, 1906; average, Apr. 19. Fall departure, (9 years' record): latest, Nov. 24, 1895; average, Oct. 14.

175. *Hylocichla ustulata swainsoni* (Tschudi).

Eastern Olive-backed Thrush.—Common transient spring and fall; may breed. F. A. Saunders reported this as the commonest thrush near Low, Quebec, (thirty miles north) in July 1898, and my own observations show it to be the common breeding species at Blue Sea Lake, fifty-six miles north of Ottawa.

Spring arrival, (7 years' record): earliest May 5, 1902; average, May 13. Fall departure, (5 years' record): latest, Oct. 21, 1902; average, Oct. 2.

176. *Hylocichla minima aliciae* (Baird).

Gray-cheeked Thrush.— Probably a regular transient, spring and fall, but not often identified. A specimen is reported by W. E. Saunders from King's Mountain. I took one five miles west of Hull, Quebec on September 10, 1921, and one killed itself by flying against my study window, Rockcliffe Park, September 22, 1928. An injured one was picked up by Dr. Bruce Kennedy on September 18, 1943, and given to me.

177. *Hylocichla fuscescens fuscescens* (Stephens).

Veery.— Common summer resident, breeds. On June 21, 1919, I found a nest at Hull, Quebec with young birds just ready to fly. A nest found at Aylmer, Quebec, May 27, 1922 contained two veery's and two cowbird's eggs; a third veery's egg had been rolled out of the nest.

Spring arrival, (15 years' record): earliest, May 5, 1902; average, May 13.

178. *Sialia sialis sialis* (Linnaeus).

Eastern Bluebird.— Common transient, spring and fall; moderately common summer resident; one winter record; breeds. I have published an account of nestlings infested with fly larvae. A bird banded by T. S. Hennessy[19] at Ottawa was recovered at Lake City, Florida, the following March. There is one winter record; a bird banded by R. E. DeLury at Hathersall's feeding station, just west of Ottawa, December 21, 1924. C. E. Johnson found a nest with five eggs not far from the city on June 3, 1921.

179. *Regulus satrapa satrapa* Lichtenstein.

Eastern Golden-crowned Kinglet. — Common transient, spring and fall; uncommon in summer and winter; breeds. It is occasionally met with on the Christmas Bird Census. The first nest recorded for the district was found by D. H. Baker, July 31, 1929 at Alcove, Quebec. The young flew and three were caught for banding. The nest is in the National Museum collection.

Spring arrival, (16 years' record): earliest, Mar. 24, 1909; average, Apr. 7. Fall departure, (20 years' record): latest, Nov. 12, 1887; average, Oct. 15.

180. *Corthylio calendula calendula* (Linnaeus).

Eastern Ruby-crowned Kinglet.— Common transient, spring and fall. Singing males are easily identified at a remarkable distance.

Spring arrival (21 years' record): earliest

19.—Can. Field-Nat., 51: 109, Oct. 1937.

Apr. 7, 1910; average, Apr. 22. Fall departure, (21 years' record): latest, Nov. 10, 1888; average, Oct. 15.

181. *Anthus spinoletta rubescens* (Tunstall). **American Pipit.** — Common transient, spring and fall. Autumn migrants frequent the bare river banks.

182. *Bombycilla garrula pallidiceps* Reichenow. **Bohemian Waxwing.** — Irregular winter visitor. Old records of occurrences are as follows: Nov. 11, 1883, five seen; 1895, one flock from January 8th on; 1897, abundant from January to April; 1904, seen Dec. 13, (G. R. White); 1906, one seen Dec. 2nd; Dec. 1908 to Mar. 1909; 1912, several seen almost daily from March 19 to 23 (G. R. White); 1917, reported in Feb. and March by R .E. DeLury. H. F. Lewis saw three at the Experimental Farm Arboretum, Jan. 1, 1941; they were in company with cedar waxwings. On the 5th, when I went there, I saw eight bohemians and twenty cedar waxwings. They were eating dried up cherries.

Fall arrival, (4 years record): earliest, Nov. 11, 1883; average, Jan. 3. Spring departure, (2 years' record): latest, March 30, 1897; average, Mar. 18.

183. *Bombycilla cedrorum* Vieillot. **Cedar Waxwing.** — Common summer resident; irregular winter visitor; breeds. W. T. Macoun reports its occurrence with the bohemian waxwings from mid-January to April 1897: specimens were taken by G. R. White; Eifrig gives winter occurrences as Dec. 1, 1906, and Feb. 22, 1908; H. F. Lewis found them at his home, Feb. 9, 1925; and, with bohemian waxwings at the Experimental Farm, Jan. 1, 1941. Nested in the Whites' garden on June 10, 1888. Eggs have been taken by C. L. Patch for the National Museum at Meach's Lake, June 23, 1914.

184. *Lanius borealis borealis* Vieillot. **Northeastern Shrike.**— A regular but rather rare winter visitor. In February, 1922, I found one singing with great abandon from the top of a tall tree near the Rideau River, Ottawa South. The song was musical and with its numerous pauses resembled that of the brown thrasher.

Fall arrival: occurs from November on. Spring departure, (7 years' record): latest, Apr. 18, 1909; average, Apr. 14.

185. *Lanius ludovicianus migrans* Palmer. **Migrant Shrike.**— Uncommon summer resident; breeds. The status of this species seems to continue the same as noted by local observers and reported in earlier lists. W. L. Scott took young birds on the Quebec side of the Ottawa River near the city, June 28, 1885. C. E. Johnson found a nest on the Bowesville Road, Ottawa South, which contained five young ready to leave, June 26, 1938. Reports of nesting shrikes should be referred to this species.

Fall departure, (2 years' record): latest, Oct. 4, 1907; average, Sept. 10.

186. *Sturnus vulgaris vulgaris* Linnaeus. **Starling.**— Abundant summer resident; fairly common winter resident; breeds. First seen in the district when one came to roost with the grackles in the White's garden, Apr. 2, 1922, where it was identified by E. G. and G. R. White. Apr. 8, E. G. White saw two near Hurdman's Bridge, and about Apr. 18, Norman Lett found two in D. M. Finnie's yard, Chapel Street. Rodney Wood believes he saw two near South Indian, Jan. 3, 1924. Jan. 5, 1924, Philip Foran and I saw two near Rockcliffe Park. Late in August, 1924, small flocks were noticed with grackles, redwings, and cowbirds near Britannia and specimens were taken confirming the identity, Sept. 5, 1924, the first for the district. About one hundred were seen at Lochaber, Quebec, Sept. 20, 1924. The Christmas Bird Census in 1924 included eighty-six starlings. This was the first winter that the birds were present in any numbers. In my addenda to the Ottawa list, 1930, it is reported that the starling had by then become a very common bird, usually migratory, but occurring in flocks in winter near the city refuse dumps. In August 1929, flocks flew to roosting places passing over my place at Rockcliffe Park in marshalled ranks numbering thousands. By 1930-31 the species was generally distributed throughout the city. Perhaps there has been a slight decrease from the first peak of abundance, but the starling is everywhere and with us to stay.

Banding returns for birds ringed by T. S. Hennessy show recoveries from Thurmont, Maryland, and Ozark, Arkansas.

Nesting records are as follows.

1923 — H. Groh reports a nesting in a huge elm at Hull, Quebec.

1925 — G. R. White reported a pair nest-

ing at Britannia.

1925 — May 17, I found a pair occupying dead top of high tree a few miles north of Hull, Quebec.

1925 — Nested on property of K. Fellowes near Hull, Quebec.

1926 — May 26, Wilmot Lloyd and I saw an occupied nest hole at Britannia.

1926 — June 1, found one occupying a bird box at the Ottawa Hunt and Golf Club.

1927 — May 28, saw a very wary bird carrying food to a dead elm top near Fairy Lake, Hull.

1928 — April 27, C. E. Johnson found a pair building in the eaves of a house in Ottawa South.

1928 — May 17, C. E. Johnson, C. L. Patch, and J. S. Lord collected a nest and two eggs near a farm bordering the Mer Bleue.

1928 — June 8, C. E. Johnson found a nest in a tall elm in Ottawa South.

1928 — June 10, C. E. Johnson found a nest with young in a hollow basswood, Rideau River.

1928 — June 20, W. Fletcher Kelly gave me a nest and four eggs which he collected from a Flicker box at his home at Britannia.

1928 — June, G. A. Miller reported that a pair nested under the shingles of his home in Ottawa South.

1928 — June 26, H. A. Lloyd collected a nestling from a nest which I found in the sand dunes, Merivale Road.

1929 — Miss A. Swain, Westboro, found starlings dispossessing flickers.

Since then starling nests are almost everywhere; in fact, in driving through the countryside, the birds can be seen attempting to build in almost every rural mail-box.

187. *Vireo flavifrons* Vieillot.

Yellow-throated Vireo.— Rare summer resident. It has been written that one was taken in mid-June 1883. W. L. Scott is recorded as taking one at Pelissier, near Kirk's Ferry, Quebec, July 21, 1884, and G. R. White took one, May 15 of that year. Two specimens in the White collection are dated May 26, 1884, and May 25, 1885. Eifrig secured four in six years. A female taken by him at Meach's Lake, Quebec, July 20, 1905 is in the National Museum collection. G. R. White's notes record its presence, May 11, 1906, and May 18, 1914.

Spring arrival: earliest, May 11, 1906.

188. *Vireo solitarius solitarius* (Wilson).

Blue-headed Vireo.— Rather rare transient, spring and fall; occurs rather late in fall migration. There are specimens in the National Museum and the White collection. A reputed nest in process of being built is recorded for Chelsea, Quebec, May 28, 1898.

Spring arrival, (8 years' record): earliest, May 8, 1904; average, May 12. Fall departure: latest, Oct. 11, 1891.

189. *Vireo olivaceus* (Linnaeus).

Red-eyed Vireo.— Abundant summer resident; breeds; occurs in almost all deciduous woods, and throughout the city. E. G. White and I watched one at close range for some time in the White's garden on November 4, 1922. A nest was taken for the National Museum, June 23, 1916 by C. E. Johnson.

Spring arrival, (15 years' record): earliest, May 6, 1905; average, May 16.

190. *Vireo philadelphicus* (Cassin).

Philadelphia Vireo.— Probably a rare transient. Examples in local collections have been seen as follows: May 13, 1886, two in White collection; May 30, 1906, one taken by Eifrig, in the National Museum collection. Others have been recorded. H. F. Lewis has furnished local sight records of individual birds as follows: Sept. 6, 1940; Sept. 11, 1941; May 20, and May 23, 1943.

191. *Vireo gilvus gilvus* (Vieillot).

Eastern Warbling Vireo.— Moderately common summer resident; presumably breeds. May be heard singing in the shade trees in many parts of the city. Specimens in the White collection are dated May 26, 1884, and May 25, 1885; while the National Museum has specimens taken respectively by John Macoun, May 29, 1888, and by F. A. Saunders, May 23, 1891.

Spring arrival, (4 years' record): earliest, May 6, 1906; average, May 14.

192. *Mniotilta varia* (Linnaeus).

Black and White Warbler.— Common transient spring and fall; fairly common summer resident; breeds. When the fall migration begins in mid-August these birds may be seen in the city shade trees. J. H. Fleming saw a pair feeding young at Rockcliffe Park, August

16, 1900. H. Groh records a nest with five eggs, June 2, 1909. C. E. Johnson saw adults feeding young at Hog's Back during the summer of 1914. A pair built a nest at the foot of a hemlock tree in the White garden and were feeding young in the nest on June 19, 1939. On May 19, 1940, they built again in the same place.

Spring arrival, (16 years' record): earliest, May 2, 1891; average, May 7. Fall departure, (4 years' record); latest, Sept. 20, 1887; average, Sept. 13.

193. *Vermivora peregrina* (Wilson).

Tennessee Warbler.— Transient, spring and fall. There are specimens in local collections.

Spring arrival, (6 years' record): earliest, May 12, 1901; average, May 16. Fall departure, latest, Sept. 30, 1889.

194. *Vermivora celata celata* (Say).

Common Orange-crowned Warbler.— Accidental. I have examined one specimen, a male shot by E. G. White near the city on September 27, 1885. It has been observed by G. R. White on May 18, 1898, and he states he secured one on May 28, 1909.

Spring arrival, (2 years' record); earliest, May 17, 1890; average, May 18. Fall departure: latest date, Sept. 30, 1889.

195. *Vermivora ruficapilla ruficapilla* (Wilson).

Eastern Nashville Warbler.— Fairly common transient; regular summer resident; breeds. G. R. White and W. L. Scott record the finding of a nest in Dow's Swamp, July 13, 1881. F. A. Saunders found it breeding there again in 1898, and at Chelsea, Quebec, and the Mer Bleue as well. Eifrig gives breeding localities in the neighbourhood of the city. The nest with four eggs in the National Museum collection was taken by C. H. Young on June 10, 1906, at Meach's Lake, Quebec.

Spring arrival, (11 years' record): earliest, May 5, 1902; average, May 14. Fall departure: latest, Oct. 10, 1900; average, Sept. 20.

196. *Compsothlypis americana pusilla* (Wilson).

Northern Parula Warbler.— Regular transient spring and fall; uncommon summer resident; breeds. Eifrig reports it in summer, and F. A. Saunders found it breeding near Low, Quebec, July 2, 1898.

Spring arrival, (17 years' record): earliest, May 7, 1896; average, May 13. Fall departure, (3 years' record): latest, Sept. 13, 1889; average, Sept. 11.

197. *Dendroica aestiva aestiva* (Gmelin).

Eastern Yellow Warbler.— Very common summer resident; breeds. It may be found in any suitable habitat, city or country. Nesting dates are: White's garden, May 12, 1888; J. H. Fleming, Rockcliffe Park, May 23, 1904.

Spring arrival, (17 years' record): earliest, May 3, 1895; average, May 7. Fall departure, (5 years' record): latest, Sept. 7, 1901; average, Aug. 20.

198. *Dendroica magnolia* (Wilson).

Magnolia Warbler.— Fairly common transient, spring and fall;breeds. It was reported in summer by W. E.Saunders (1890), and by Eifrig in the 1910 list. F. A. Saunders records it as breeding at Low, Quebec, July 2, 1898. I took an almost fully developed egg from the oviduct of one shot at Aylmer, Quebec, on May 25, 1922.

Spring arrival, (19 years' record): earliest, May 8, 1896; average, May 13. Fall departure: latest, Sept. 19, 1895; average, Sept. 17.

199. *Dendroica tigrina* (Gmelin).

Cape May Warbler.— Regular spring transient; no evidence of breeding; one fall specimen (picked up dead, Ottawa, Aug. 23, 1922 by Philip Foran). There are specimens in local collections.

Spring arrival, (15 years' record): earliest, May 11, 1900; average, May 16.

200. *Dendroica caerulescens caerulescens* (Gmelin).

Black-throated Blue Warbler.— Common transient, spring and fall; summer resident; breeds. It is more numerous at migration times than in summer. F. A. Saunders found nests at Chelsea, Quebec, June 16, 1898.

Spring arrival, (20 years' record): earliest, May 6, 1890; average, May 11. Fall departure, (4 years' record): latest, Oct. 7, 1900; average, Sept. 29.

201. *Dendroica coronata* (Linnaeus).

Myrtle Warbler.— Abundant transient, spring and fall; uncommon summer resident; one winter occurrence; breeds. H. F. Lewis found one at Wychwood, Quebec, on the Christmas

Bird Census, December 22, 1923. The occurrence of this species at the Mer Bleue in summer is noted in the 1891 list. E. G. White reports it as breeding, near Berry's Wharf, South March Township, Ontario, during the summer of 1921.

Spring arrival, (15 years' record): earliest, Apr. 23, 1889; average, May 2. Fall departure, (9 years' record): latest, Nov. 3, 1888; average, Oct. 23.

202. *Dendroica virens virens* (Gmelin).

Black-throated Green Warbler.— Common transient, spring and fall; regular summer resident; breeds. J. H. Fleming saw a pair feeding young at Rockcliffe Park on August 16, 1900. Eifrig records it as breeding.

Spring arrival, (16 years' record): earliest, May 4, 1885; average, May 13. Fall departure, (7 years' record): latest, Oct. 8, 1887; average, Sept. 27.

203. *Dendroica cerulea* (Wilson).

Cerulean Warbler.— Probably a very rare summer resident. R. E. DeLury has recorded his observation of two or three of these birds at a point twenty-two miles south of the city on May 14, 1922. This is the only record.

204. *Dendroica fusca* (Müller).

Blackburnian Warbler.— Common transient, spring and fall; summer resident; breeds. This species is often observed in summer and probably nests in numbers. F. A. Saunders found it breeding at Chelsea, Quebec, June 24, 1898, and commonly near Low, Quebec, July 2 and 3, 1898. In the summer of 1912 Taverner found a female feeding a young cowbird at Rockcliffe Park.

Spring arrival: earliest, May 8, 1885 and 1896; average, May 13.

205. *Dendroica pensylvanica* (Linnaeus).

Chestnut-sided Warbler.— Fairly common transient and summer resident; breeds. Most observers report it in summer. Eifrig, and the 1891 list gave it as breeding. C. E. Johnson found a nest with four young, June 23, 1916.

Spring arrival, (16 years' record): earliest, May 8, 1895; average, May 14. Fall departure, (5 years' record): latest, Sept. 12, 1885; average, Aug. 23.

206. *Dendroica castanea* (Wilson).

Bay-breasted Warbler.— Fairly common transient, spring and fall. The spring migration goes through late and rapidly. If the observer happens upon a real migration wave the birds may be seen in large numbers. It is difficult to separate this from the next species by sight alone in fall.

Spring arrival, (14 years' record): earliest, May 11, 1886; average, May 17. Fall departure, (3 years' record): latest, Sept. 16, 1898; average, Sept. 8.

207. *Dendroica striata* (Forster).

Black-poll Warbler.— Common transient, spring and fall. This is a late spring migrant that seems to pass through rapidly. It is difficult to tell from the bay-breasted warbler in fall.

Spring arrival, (14 years' record): earliest, May 15, 1900; average, May 21. Fall departure, (3 years' record): latest, Sept. 27, 1889; average, Sept. 19.

208. *Dendroica pinus pinus* (Wilson).

Northern Pine Warbler.— Rather rare; locally distributed; summer resident; breeds. A specimen taken May 8, 1884, which was said to be the fifth record for Ottawa, is in the White collection. The Whites have spring dates for 1885, and E. G. White took one on August 27, 1885. I found it at Fairy Lake, near Hull, Quebec, May 19, 1923 and took one, July 15, 1923. The species was found there again, May 18, 1924, and on the 21st Taverner took a specimen for the National Museum collection. H. F. Lewis has reported the finding of Pine Warblers in song at three stations near Ottawa as follows: one, Sept. 18, 1941, in white pine grove between Blanche River and Quebec Highway No. 8, about eight miles northeast of Ottawa; two, May 25, 1942, and May 27, 1943, among red and white pines at Wychwood, Quebec, about seven miles west of Ottawa; one, April 28, 1943, in white pine grove at South March, Ontario, about thirteen miles southwest of Ottawa. He considers it probable that it nests at all three stations, with the probability greater for Wychwood and South March than for the other. F. A. Saunders records the species as breeding at the Experimental Farm in June, 1898.

Spring arrival; average date, May 17.

209. *Dendroica palmarum hypochrysea* Ridgway.

Yellow Palm Warbler.— Transient and summer resident; breeds. A male and two juven-

iles were taken at the Mer Bleue on July 3, 1890 by W. E. Saunders. C. H. Young found two nests with four eggs each at the Mer Bleue, May 25, and July 6, 1908. In 1923 some Ottawa birds were identified as *palmarum*, but re-examination of local material with A. L. Rand, and using a better series of western specimens for comparison, shows that Ottawa birds, while intermediate, are closer to *hypochrysea*.

210. *Seiurus aurocapillus* (Linnaeus).

Oven-bird.— Moderately common transient, spring and fall; summer resident; breeds. The flight song is a common experience, day and night, at my home in years when this species is nesting nearby. C. H. Young collected a nest with four eggs for the National Museum at Meach's Lake, Quebec, June 24, 1907.

Spring arrival, (13 years' record): earliest, May 10, 1897; average, May 16. Fall departure, (4 years' record): latest, Sept. 29, 1900; average, Sept. 23.

211 *Seiurus noveboracensis noveboracensis* (Gmelin).

Northern Water-Thrush.— Moderately common transient, spring and fall; summer resident; breeds. There are specimens in local collections. Summer records are fairly numerous and it is reported as breeding in Dow's Swamp. Eardley Young took a nest with five eggs for the National Museum collection at Meach's Lake, Quebec, May 20, 1916.

Spring arrival, (3 years' record): earliest, May 8, 1905; average, May 10. Fall departure, (2 years' record): latest, Sept. 17, 1891; average, Sept. 16.

212. *Oporornis philadelphia* (Wilson).

Mourning Warbler.— Rather uncommon transient, spring and fall; and uncommon, but regular summer resident. Several specimens have been taken during the breeding season, and Eifrig gives localities where it is said to nest. F. A. Saunders records it as breeding in Dow's Swamp. There is usually a pair about my garden in summer.

Spring arrival, (8 years' record): earliest, May 10, 1891; average, May 24. Fall departure, one date, Aug. 28, 1896.

213. *Geothlypis trichas brachidactyla* (Swainson).

Northern Yellow-throat. — Moderately common transient, spring and fall; regular summer resident; breeds. Nests are recorded as having been found in the Mer Bleue, June 22, 1898, and at Dow's Swamp, June 23, 1898. C. H. Young took two nests for the National Museum, each with four eggs, June 8 and 11, 1908. One nest with four eggs was taken for the National Museum, June 23, 1916, near Ottawa, by C. L. Patch.

Spring arrival, (9 years' record): earliest, May 4, 1905; average, May 16. Fall departure, (4 years' record): latest, Sept. 27, 1889; average, Sept. 18.

214. *Wilsonia pusilla pusilla* (Wilson).

Wilson's Warbler.— Moderately common transient, spring and fall. Although it has been found here in the nesting season, not yet known to breed.

Spring arrival, (17 years' record): earliest, May 14, 1893; average, May 20. Fall departure, (4 years' record): latest, Sept. 25, 1888; average, Sept. 19.

215. *Wilsonia canadensis* (Linnaeus).

Canada Warbler.— Moderately common transient and summer resident. F. A. Saunders records it as breeding in Dow's Swamp and elsewhere in 1898, and Eifrig also gives it the status of a breeding species.

Spring arrival, (14 years' record): earliest, May 15, 1888; average, May 21. Fall departure, one date, Sept. 5, 1890.

216. *Setophaga ruticilla* (Linnaeus).

American Redstart. — Common transient, spring and fall; summer resident; breeds. A nest was found at Lover's Walk, Parliament Hill by G. R. White, June 24, 1894. C. E. Johnson found one building at Dow's Swamp, May 27, 1919, and located another nest near the Rideau River in the vicinity of Billings' Bridge on the same day. It has nested fairly regularly in or near my garden.

Spring arrival, (17 years' record): earliest, May 3, 1887; average, May 16.

217. *Passer domesticus domesticus* (Linnaeus).

English Sparrow.— Abundant resident, breeds. It was introduced at Ottawa in 1870. It is rather uncommon at Rockcliffe Park where I live.

218. *Dolichonyx oryzivorus* (Linnaeus).

Bobolink.— Common summer resident; breeds.

C. E. Johnson has observed them in courtship on May 24, 1921; and feeding young, June 25, 1922.

Spring arrival, (31 years' record): earliest, May 3, 1904; average, May 16. Fall departure, (11 years' record): latest, Sept. 29, 1892; average, Sept. 10.

219. *Sturnella magna magna* (Linnaeus).

Eastern Meadowlark. Common summer resident; breeds. A few have been noted in early winter. Eifrig gives May 11th as a date for a nest with fresh eggs.

Spring arrival, (34 years' record): earliest, Jan. 10, 1909; average, Apr. 2. Fall departure, (22 years' record): latest, Nov. 13, 1915; average, Oct. 15.

220. *Agelaius phoeniceus phoeniceus* (Linnaeus).

Eastern Red-wing.— Abundant summer resident, breeds. I found a nest with fresh eggs at Black Rapids on the Rideau River, June 4, 1921. C. E. Johnson reports finding a nest with four eggs on the Rideau River, June 9, 1940.

Spring arrival, (30 years' record): earliest, Mar. 15, 1902; average, Apr. 2. Fall departure, (20 years' record): latest, Nov. 7, 1905; average, Oct. 18.

221. *Icterus galbula* (Linnaeus).

Baltimore Oriole— Moderately common summer resident; breeds; nests regularly in city and suburban shade trees. A bird picked up injured on May 27, 1922 had an egg with shell in the oviduct.

Spring arrival (31 years' record): earli- May 3, 1899; average, May 10. Fall departure,(15 years' record): latest, Sept. 16, 1885; average, Aug. 25.

222.*Euphagus carolinus* (Müller).

Rusty Blackbird. — Abundant transient in spring and fall. A tree full of "Rusties" singing their spring-time chorus is always an event.

Spring arrival, (28 years' record): earliest, Mar. 19, 1894; average, Apr. 20. Fall departure (25 years' record): latest, Nov. 5, 1890; average, Oct. 17.

223. *Quiscalus quiscula aeneus* Ridgway.

Bronzed Grackle.— Very abundant summer resident; a few winter records; breeds. This is one of our commonest birds, nesting generally in the city. C. L. Patch found one at his home in Lindenlea on December 25, 1922. After this was reported in the press Philip Foran reported that he had found three wintering birds at Rivermead, Quebec, in 1920, and two at the same place in 1921. On December 22, 1923 two were included in the Christmas Bird Census; they had been frequenting a feeding station at Britannia for some time previous. Lloyd McCaughey reported one at his Britannia feeding station on February 13, 1944. A bird banded by me at Ottawa was taken at Zuni, Virginia. About June 10, 1925, C. E. Johnson noted a piebald specimen, with head almost all white and body sparingly mottled, at Lansdowne Park Ottawa, where it was seen for a week. C. E. Johnson reports a nest with five young at the Mer Bleue on June 3, 1943.

Spring arrival, (38 years' record): earliest; Mar. 8, 1907; average, Mar. 28. Fall departure, (26 years' record): latest, Nov. 12, 1887; average, Oct. 11 (see winter dates above).

224. *Molothrus ater ater* (Boddaert).

Eastern Cowbird.— Abundant summer resident; accidental in winter; breeds. I saw a male bird in the company of a flock of English Sparrows at Stittville on November 17, 1923. On January 31, 1944, P. A. Taverner advised me that a male in fine plumage had been coming to his feeding station for a month past. This is the first winter record.

Spring arrival, (32 years' record): earliest, Mar. 21, 1907; average, Apr. 6. Fall departure, (9 years' record): latest, Nov. 1, 1887; average, Oct. 5.

225. *Piranga erythromelas* Vieillot.

Scarlet Tanager.— Rather uncommon transient, spring and fall; summer resident; probably breeds. A wave of migration may bring in a number at once. A male in the White collection taken August 26, 1885, is in changing plumage. The 1891 and 1910 lists give it as a breeding species which is probably true.

Spring arrival, (25 years' record): earliest, May 17, 1912; average, May 20. Fall departure, (11 years' record): latest, Oct, 3, 1914; average, Sept. 14.

226. *Richmondena cardinalis cardinalis* (Linnaeus).

Eastern Cardinal.— Accidental; about three occurrences. One was seen in Ottawa by H. B. Small during the spring of 1888. An-

other was observed near Colonel W. P. Anderson's place in June 1911. One was seen by several observers in A. G. Kingston's garden, Nov. 28 and 29, 1923. This bird, or another, was seen, Apr. 13, 1924. It will be interesting to watch whether this species will come northward into this district as it has at Toronto, and elsewhere.

227. *Hedymeles ludovicianus* (Linnaeus).

Rose-breasted Grosbeak.— Moderately common summer resident; breeds. There are specimens in the local collections. A fall date is given by a male in my collection taken at Hull, Quebec, Sept. 12, 1921. J. H. Fleming found a nest with four eggs at Rockcliffe Park, May 24, 1904. C. L. Patch observed young in the nest at Meach's Lake, Quebec, during the last week of June 1914. It has nested in my garden.

Spring arrival, (20 years' record): earliest, May 8, 1886; average, May 13. Fall departure, (3 years' record): latest, Oct. 1, 1908; average, Sept. 15.

228. *Passerina cyanea* (Linnaeus).

Indigo Bunting.— Rather rare; locally distributed; summer resident; breeds. On July 9, 1922, C. L. Patch and I found a nest with four young about five miles east of Ottawa.

Spring arrival, (6 years' record): earliest, May 13, 1893; average, May 23. Fall departure, (4 years' record): latest, Sept. 12, 1887; average, Aug. 29.

229. *Spiza americana* (Gmelin).

Dickcissel.— Accidental; two records. One male spent the summer of 1895 at the Experimental Farm where it was identified by F. A. and W. E. Saunders. After spending two or three days in R. E. DeLury's garden, near the Experimental Farm, one was caught and banded there, Aug. 26, 1934, and it was seen again on the 27th.

230. *Hesperiphona vespertina vespertina* (Cooper).

Eastern Evening Grosbeak.— Fairly regular transient and winter visitor. It was first recorded at Ottawa in the spring of 1897, when two were taken, Mar. 30th near Rideau Hall. They were next recorded in March 1901, and were found in the winters of 1908-9, 1912-13, 1915-16, 1916-17, 1918-19, and probably every winter since. They commonly remain until May. H. F. Lewis reports an exceptionally heavy invasion in March and April 1939. I have one specimen, a male, which was banded by M. J. Magee at Sault Ste. Marie, Michigan, Jan. 27, 1937, and found injured at Ottawa and reported by Mrs. D'Arcy McGee, Mar. 20, 1939. Another male in my collection was banded by James P. Melzer at Milford, New Hampshire, Jan. 28, 1934, and found injured and reported by George Garneau at Hull, Quebec, April 30, 1939. This and other evidence appears to indicate a west-east and east-west migration.

231. *Carpodacus purpureus purpureus* (Gmelin).

Eastern Purple Finch.— Abundant transient; common summer resident; occasional winter resident; breeds. Usually rather irregular in its migration which banding indicates to be eastward in fall and westward in spring. A large flock frequented my home feeding station in late February and March 1929. They were also present at R. E. DeLury's feeding station. W. T. Macoun has recorded several nests found at the Experimental Farm. A. R. Legge took a nest with four eggs, and one cowbird egg, at Hull, Quebec, on May 28, 1899, for the National Museum.

Spring arrival, (12 years' record): earliest, Feb. 20, 1909; average, Mar. 18. Fall departure, (7 years' record): latest, Nov. 24, 1885; average, Nov. 11.

232. *Pinicola enucleator leucura* (Müller).

Canadian Pine Grosbeak.— Irregular winter visitor; present almost every winter; common some years. On October 27, 1903, E. G. White saw 1,500 at McKay's woods, of which only two were in the red plumage. At Rockcliffe Park they are often seen budding in the tops of sugar maples. I have two picked up dead the same day, March 26, 1939, at Rockcliffe Park, one found by Mrs. James and one by H. A. Lloyd.

Fall arrival: Nov. 1, 1883 earliest date; spring departure, (5 years' record): latest, May 21, 1883; average, Mar. 23.

233. *Acanthis hornemanni exilipes* (Coues).

Hoary Redpoll.— Probably uncommon winter visitor. In the 1891 list it is stated that W. L. Scott secured specimens in the Spring of 1883 which were identified by Coues. There are specimens in the White collection. About

one per cent of the seven hundred Redpolls measured and banded by R. E. DeLury in the late winter of 1926 were identified as of this species and race.

234. (a) *Acanthis linaria linaria* (Linnaeus). **Common Redpoll.**— Common transient and winter visitor. Most of the 700 Redpolls which R.E. DeLury measured in 1926 belong under this heading, although some might have been *A. l. holboelli.* He found every variation between *A. l. linaria* and *A. l. rostrata.*

Spring departure, (6 years' record): latest, May 14, 1909; average, Apr. 9.

(b) *Acanthis linaria rostrata* (Coues). **Greater Redpoll.**— Moderately common transient and winter visitor. There are specimens in the White collection. R. E. DeLury found nearly 200 *rostrata* among the 700 Redpolls he measured in 1926. As spring advanced small flocks came in, and at times the proportion of greater redpolls increased. He found great differences in size even among birds he classified as *rostrata.*

235. *Spinus pinus pinus* (Wilson).

Northern Pine Siskin.— Irregular winter visitor; sometimes abundant; rare in summer; may breed. Very abundant at the Christmas Bird Census, December 24, 1922, when six parties found about 900 individuals, far the commonest bird at this census. Siskins visited R. E. DeLury's feeding station in numbers during the winter of 1928-9 and a flock frequented my home station during March 1929.

236. *Spinus tristis tristis* (Linnaeus).

Eastern Goldfinch.— Abundant transient; summer resident; sometimes common in winter; breeds. G. R. White had many dates in his notes from January 14th on, winter of 1885-6. Large flocks are said to have wintered in 1888-9. C. E. Johnson collected a nest with six eggs for the National Museum, near Ottawa, July 31, 1916.

Spring arrival, (11 years' record): average, May 14. Fall departure, (7 years' record): Oct. 21 (some winter).

237. *Loxia curvirostra pusilla* Gloger.

Red Crossbill.— Erratic visitor; has been found here in almost every month of the year; sometimes common.

238. *Loxia leucoptera* Gmelin.

White-winged Crossbill.— Erratic visitor; has been found in summer, but more usual in winter; sometimes common. A flock was identified by H. F. Lewis, Robert Lockwood, and Harlow Wright, near Aylmer, Quebec, on the Christmas Bird Census, Dec. 26, 1927. Three were seen in the White garden, Feb. 7, 1928. A. E. Porsild and I found a small flock of eight, half of them brilliant males, among hemlocks, Dec. 21, 1930. Other census takers at Ottawa also found some on the same day.

239. *Pipilo erythrophthalmus erythrophthalmus* (Linnaeus).

Red-eyed Towhee.— Rare summer resident; one winter record; breeds. Two males were seen by E. G. White in Beechwood cemetery, June 28, 1908. Eifrig gives a number of occurrences for 1909. One was seen May 10, 1918 by J. Philip Bill and others. C. E. Johnson saw one on four occasions ending with May 16, 1926, at Peat's Island in the Rideau River, Ottawa South. One visited our home grounds at Rockcliffe Park in the spring of 1929 and sang near the house. It was noted by Robert Lockwood, Apr. 29, 30, May 5, 8, and 9. R. E. DeLury has several records for his garden and one for the Experimental Farm. H. F. Lewis observed a male feeding and singing at Dow's Swamp, May 2, 1936. The only winter record[20] is that of a bird found in mid-November at the home of Alex. Roger, Billings' Bridge. It was watched and fed until Jan. 14, 1937, but was found dead, Jan. 17. It was in good condition of flesh. A nest containing three eggs and one cowbird egg was found by C. H. Young, A. La Rocque, and C. E. Johnson at Constance Bay, June 11, 1933, and collected for the National Museum.

240. *Passerculus sandwichensis savanna* (Wilson).

Eastern Savannah Sparrow.— Abundant summer resident, breeds. C. E. Johnson reports; adults feeding young, June 3, 1921; nest with four young, Ottawa South, June 10, 1930; nest with five eggs at Mer Bleue, May 24, 1932; and nest with five eggs at Carlsbad Springs, May 25, 1933.

Spring arrival, (14 years' record): earliest, Mar. 31, 1907; average, Apr. 14. Fall departure, (14 years' record): last seen Oct. 21, 1908; average Oct. 3.

20.—Can. Field-Nat., 51: 77, May, 1937.

241. *Ammodramus savannarum australis* Maynard.

Eastern Grasshopper Sparrow.— Very rare summer resident; three records. Found by F. A. Saunders at Hull, Quebec, June 24th and at the Experimental Farm, June 26 and 27, 1898; a specimen was taken, June 28. It was also found by Eifrig at the Experimental Farm, June 30, 1909.

242. *Ammospiza caudacuta nelsoni* (Allen).

Nelson's Sparrow.— Rare or accidental. G. R. White shot one at Lochaber, Quebec, Sept. 23, 1922, and saw another, Oct. 2, 1922. E. G. White saw four at Fish Bay (same vicinity), Oct. 16, 1937. He had one in hand, too badly shot to preserve.

243. *Pooecetes gramineus gramineus* (Gmelin).

Eastern Vesper Sparrow.— Abundant summer resident; breeds; one winter record. C. L. Patch took a nest for the Museum, June 23, 1916. I found one with large young at Crown Point, July 13, 1940. One was seen near Dow's Swamp, Jan. 9 & 10, 1944 (A. L. Rand).

Spring arrival, (17 years' record): earliest, Apr. 1, 1907; average, Apr. 13. Fall departure, (10 years' record): latest, Oct. 17, 1885; average, Oct. 7.

244. *Junco hyemalis hyemalis* (Linnaeus).

Northern Slate-colored Junco. — Abundant transient, spring and fall; rather uncommon summer and winter resident; breeds. It has been found on Christmas Bird Censuses. E. G. White reports two in his garden from January 7 to 21, 1940 and through February and March of that year. Eifrig records finding a nest with four eggs at Meach's Lake, Quebec on July 6, 1908. C. L. Patch found a nest with young at Rockcliffe Park on May 24, 1920. I have seen adults on Parliament Hill on July 1st.

Spring arrival, (24 years' record): earliest, Mar. 22, 1908; average, Apr. 1. Fall departure, (18 years' record): average, Nov. 3 (Some winter).

245. *Spizella arborea arborea* (Wilson).

Eastern Tree Sparrow.— Abundant transient, spring and fall; rather uncommon winter resident. F. Hennessey and I found it at Hull, Quebec, Dec. 24, 1920. There are December and February specimens in the White collection. Occasionally noted in the Christmas Bird Census.

Spring arrival, (18 years' record): earliest, Jan. 2, 1886; average, Apr. 12. Fall departure, (13 years' record): average Oct. 30, (Some winter).

246. *Spizella passerina passerina* (Bechstein).

Eastern Chipping Sparrow.— Common summer resident; breeds. A nest with eggs was taken for the National Museum by C. L. Patch at Meach's Lake, June 23, 1914.

Spring arrival, (21 years' record): earliest, Apr. 12, 1905; average, Apr. 20. Fall departure, (6 years' record): latest, Oct. 17; average, Oct. 2.

247. *Spizella pusilla pusilla* (Wilson).

Eastern Field Sparrow.— Probably a rare summer resident. F. A. Saunders found it four miles south-east of King's Mountain, July 2, 1892. In 1898 he located the species north of our boundaries, at Kazubazua, Quebec. On August 7, 1899 W. E. Saunders noted two in song in the district. A specimen in the White collection was taken by E. G. White at Hurdman's Bridge, Oct. 20, 1905. He took another the same day and saw several on the 9th and 10th of the same month. I took one at Constance Lake, Sept. 1, 1924. E. G. White found one at Carp, May 16, 1925.

248. *Zonotrichia leucophrys leucophrys* (Forster).

Eastern White-crowned Sparrow.— Common transient, spring and fall.

Spring arrival, (24 years' record): earliest, Apr. 30, 1906; average, May 7. Fall departure, (15 years' record): latest, Nov. 4, 1887, average, Oct. 8.

249. *Zonotrichia albicollis* (Gmelin).

White-throated Sparrow.— Abundant transient, spring and fall; common summer resident; accidental in winter; breeds. There is a record of one being seen at Russell, Ontario by W. A. D. Lees, Dec. 8, 1898. On December 24, 1922, C. E. Johnson found one south of the city and C. L. Patch and D. Blakely found another east of the city. The species nested in the White's garden in 1922, and there is a local nest in the National Museum.

Spring arrival, (27 years' record): earliest, Apr. 15, 1908; average, Apr. 26. Fall departure, (15 years' record): latest, Nov. 9, 1893; average, Oct. 19.

250. *Passerella iliaca iliaca* (Merrem).

Eastern Fox Sparrow.— Moderately common

transient, spring and fall. It is often seen in my garden at migration time. C. E. Johnson records four, Apr. 13, 1925; five, Oct. 18, 1933, in Ottawa South.

251. *Melospiza lincolni lincolni* (Audubon).

Lincoln's Sparrow.— Rather rare transient, spring and fall. G. R. White took one, May 16, 1884. R. E. DeLury has banded several at his station. E. G. White reports seeing two near his residence, April 20, 1927. H. F. Lewis observed one near Manotick, October 9, 1941.

Spring arrival, (4 years' record): May 12, 1905; average, May 16.

252. *Melospiza georgiana* (Latham).

Swamp Sparrow.— Common summer resident; breeds. Robert Lockwood found a nest with four eggs and one cowbird egg at Fairy Lake, Hull, Quebec, June 3, 1929.

Spring arrival, (5 years' record): earliest, Apr. 18, 1906; average, May 10. Fall departure, (12 years' record): latest, Oct. 22, 1895; average, Oct. 8.

253. *Melospiza melodia melodia* (Wilson).

Eastern Song Sparrow.— Abundant summer resident; very rare winter resident; breeds. Two were seen at Deschenes, Quebec, by H. F. Lewis and Robert Lockwood, Dec. 28, 1924. C. E. Johnson and I found one at the Ottawa South dump, Jan. 6, 1925. C. E. Johnson, and C. M. and R. Sternberg found one there, Dec. 26, 1927. A nest with eggs taken by W. A. D. Lees, June 16, 1889 is in the National Museum collection. Another nest date furnished by C. E. Johnson is June 4, 1933.

Spring arrival, (21 years' record): earliest, Mar. 12, 1894; average, Mar. 24. Fall departure, (15 years' record): latest, Nov. 26, 1885; average, Oct. 24. (occasional in winter).

254. *Calcarius lapponicus lapponicus* (Linnaeus).

Lapland Longspur. — Probably uncommon transient and winter visitor. It was found in numbers in the Spring of 1890 by F. A. Saunders; several local specimens were taken then. H. F. Lewis[21] has recorded observing two near Aylmer, Quebec, Dec. 26, 1937. He saw two near Manotick, Oct. 9, 1941. Careful observation may show it to be commoner than thought.

255. *Plectrophenax nivalis nivalis* (Linnaeus).

Eastern Snow Bunting.— Abundant transient and winter resident. W. L. Scott records in 1884 that snow buntings lived on the refuse of the streets. The best place to find them nowadays is in fields where manure is being spread.

Fall arrival, (3 years' record): earliest, Oct. 20, 1908; average, Oct. 28; spring departure: one date, Apr. 14, 1908.

THE BREEDING DISTRIBUTION, HISTORY AND POPULATION OF THE NORTH ATLANTIC GANNET (*Sula bassana*). PART I A HISTORY OF THE GANNET'S COLONIES, AND THE CENSUS IN 1939. *By James Fisher and H. G. Vevers, 1943, Journal, Animal Ecology, 12, pp. 173-213.*

This is interesting as being one of the few surveys of some accuracy of the breeding population of an animal, and a sample of the cooperative work in birds that is developing in Britain. In 1939 the colonies containing about 97.5% of the world's gannets were visited, and counts and estimates put the breeding population at 165,600 + 9,500 individuals. They breed at 22 colonies; 16 from Britain to Iceland, and 6 in the Gulf of St. Lawrence. The history of each colony is sketched, and its present status given. On our side of the Atlantic gannets breed at Bird Rocks, Magdalen Islands (1250 pairs, 1934); Bonaventure Island (6680 pairs, 1940); Gull-cliff Bay, Anticosti Island (496 nests, 1940); and in Newfoundland at Cape St. Mary, Avalon (4295 nests, 1939); Bacalvieu Island (200 pairs, 1941) and Funk Island (7 pairs, 1936). They formerly bred at Perroquet Islands, Mingans, P.Q.; Gannet Rock, Yarmouth, N.S.; and Gannet Rock, Grand Manan, N.B. A discussion of the data is reserved for a later paper. — A. L. RAND.

21.—Can. Field-Nat., 52: 93, September, 1938.

ALBERT BURTON GRESHAM
1905—1941

By J. DEWEY SOPER
Winnipeg, Manitoba.

THE SUBJECT of this memorial sketch was born in Perth, Australia, on March 12, 1905. His parents were Mr. and Mrs. Jonathan Gresham who originally came from England. When "Burt" was a small boy the family moved to Canada and settled at Elkhorn, Manitoba, where the lad received his common school education. With this completed, he then attended St. John's High School and the University of Manitoba in Winnipeg.

During his high school days, if not earlier, Gresham developed a pronounced flair for natural history. This interest grew steadily stronger as time went on until it became a dominant trait that motivated much of his outlook and action in adult life. His greatest pleasure was derived from the field of ornithology, but he also took a keen interest in mammals. In pursuit of these studies he gradually went farther afield in Manitoba and eventually travelled to many points in all of the Prairie Provinces and the Rocky Mountains.

Early in the thirties he became ardently devoted to bird banding to which he made important contributions. Most of this work was conducted on a wooded lot near Red River, on the northern outskirts of Greater Winnipeg, which was purchased expressly for this purpose. As time permitted he travelled more widely to band at waterfowl colonies on the Great Plains to the west.

Gresham was no less enthusiastic in regard to wildlife photography in which he became an expert. Much of his savings went into expensive equipment, including several cameras for specialized types of nature photography and darkroom apparatus for personally processing his materials. His bird and mammal photographs were widely known and admired. This was particularly true of his celebrated Blue Goose pictures which were taken from the ground and by airplane during the spring migrations in Manitoba. In Western Canada he was in the forefront among the few pioneers who more or less specialized in modern flight photography of wildfowl.

In 1922, Gresham became an active member of the Manitoba Natural History Society and successively held the offices of ornithological secretary, ornithological chairman, mammalogical chairman and vice-president. He was subsequently elected to membership in the Ottawa Field-Naturalists' Club, the Wilson Ornithological Club and the American Ornithologists' Union. During part of his life he followed the profession of free-lance journalism, but for many years prior to World WarII he served on the staff of the Winnipeg Free Press as cameraman-reporter. To this paper he contributed numerous illustrated articles of topical interest on birds and mammals, as he also did to various nature magazines and other periodicals.

Despite his many other responsibilities and interests, he joined the militia as a private in 1926. With his usual energy and zest he mastered the art of soldiering and rose steadily in the ranks. On October 7, 1937, he was married to Miss Margaret Kathleen Marr of Winnipeg.

After the outbreak of war he served for nearly one and a half years in Jamaica and then with the rank of major, in the Winnipeg Grenadiers, proceeded to Hong Kong, in November, 1941. There, at the head of his men, he died in action on December 24 of the same year during the Japanese attack on that colony. Major Gresham possessed an attractive personality combined with high spirits and a quick imagination and his vigorous enthusiasm for the out-of-doors and wildlife in general was positively infectious. His untimely death was a distressing occurrence to a large circle of relatives and friends. He is survived by his wife, mother and two sisters and a brother.

EARLY STUDIES OF MILKWEED UTILIZATION IN CANADA[1, 2]

By HAROLD A. SENN

Division of Botany and Plant Pathology, Department of Agriculture, Ottawa.

COMMON MILKWEED, *Asclepias syriaca* L., is a ubiquitous weed in much of Eastern Canada. It has long attracted attention because of the coma which is attached to the seed, making the plant most conspicuous when the pods open in early fall. The milky juice or latex, which the plant contains, has also long attracted attention.

For many years suggestions have been made that milkweed should be utilized in industry. These suggestions include the use of the bast fibre of the stem as commercial fibre for spinning or as tow, the floss or seed hairs as a buoyant material similar to kapok, the rubber or rubber-like substance contained in the plant as commercial rubber, the stems as raw material in paper-making and the seeds as a source of vegetable oil and meal. The young shoots of milkweed have been used as human food and the plant is reported to be a good source of nectar for bees. The literature referring to these many uses has recently been summarized by Whiting (1).

Despite the relatively voluminous literature on the potential utilization of milkweed it is only recently that an actual commercial industry has been set up based on one of its products. In the United States the Milkweed Floss Division of War Hemp Industries, Inc., an agency owned and controlled by the United States Department of Agriculture, has purchased wild milkweed pods in order to separate the floss and utilize it as a substitute for kapok in life preservers. The Milkweed Floss Corporation of America is carrying out the processing operation and has now erected a plant at Petoskey, Mich., with a capacity of approximately 1,500,000 pounds of floss per year. The floss produced is being used by the United States Navy.

Research workers in the U.S.S.R. have for some time been interested in the possibilities of utilizing milkweed as a rubber plant. In Canada both the Dominion Department of Agriculture and the National Research Council of Canada have carried out extensive investigations on the production and possible use of milkweed rubber and resins in the rubber industry. The possible uses of milkweed floss have also been studied. As a result of this preliminary work 571 acres of milkweed was planted in the vicinity of Peterborough, Ontario, in 1943, these plantings being made through the cooperation of the Agricultural Supplies Board of Canada and the Ontario Department of Agriculture. This is probably the largest acreage of cultivated milkweed in the world although figures for the U.S.S.R. are not available.

The Division of Botany and Plant Pathology of the Department of Agriculture has conducted experiments with some fifteen species of *Asclepias*, the most important of these being *Asclepias syriaca* L., Common Milkweed and *A. incarnata* L., Swamp Milkweed. The details of these experiments will be reported elsewhere. In view of the great current interest in milkweed, particularly in these two species, it is notable that Canadians many years ago studied their possibilities. Many of our wild plants have great potential value in industry but long years of arduous research are usually necessary to demonstrate these values and reach the stage of commercial production. Milkweed is a native plant which has now reached this stage. The possibilities of milkweed have been studied particularly in France, Germany, the U.S.S.R., the United States, and Canada. Only early Canadian studies are reviewed below.

BOTANICAL SOCIETY OF CANADA

On March 28, 1861, at the fifth meeting of the Botanical Society of Canada held at Kingston, Ontario, a paper entitled "On the *Asclepias incarnata* L., as a Fibre Producing Plant" was presented by Judge Alexander Logie of Hamilton (2). Logie described this

1. —Received for publication April 18, 1944.
2. —Contribution No. 775 from the Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa, Canada.

species, which is commonly known as swamp milkweed, and recounted his finding plants of it on the shore of Burlington Bay in 1859. He also reported that this species had been successfully cultivated on dry sandy loam by Mr. John Freed, a gardener in Hamilton.

Material of this plant had been sent to Mr. J. McMicking, Gore Paper Mills, Dundas, in the spring of 1860 in order to test its qualities for paper making. McMicking reported that the Asclepias fibre when bleached for three minutes was of a whiter and brighter colour than the Manilla fibre, then in use, bleached for twenty-four hours. He estimated its value as five cents per pound for making paper and ten cents for other purposes. He stated that there seemed no doubt concerning the utility and value of the fibre but questioned whether it could be cultivated successfully and profitably.

Judge Logie exhibited a number of specimens including the fibre in various stages of preparation and suggested that members of the Society attempt to cultivate the plant and estimate the yield which would be obtained. He recommended that the seed be sown in any good moist garden soil and the plants transplanted the following spring to the place where they were to remain. He suggested that they be set out in distances no less than 18" apart each way.

The Annals of the Botanical Society of Canada concludes with a "communication from His Excellency Lord Monck (then Governor-General of Canada) on a fibre plant suited to the climate of Canada" (3). This consisted of a letter from Denis Godley, Secretary to Lord Monck, dated Quebec, May 16, 1862 and addressed to Professor George Lawson, Secretary to the Botanical Society of Canada. The letter transmitted a copy of a communication addressed to Lord Lyons by Frederic W. Hart, M.D., St. Louis, together with seeds sent by Dr. Hart. Lord Monck suggested that the Botanical Society of Canada might be interested in this problem and requested further that the seeds be sown in order to test the value of the plant.

Dr. Hart's letter under date of May 1, 1862, stated that during a recent sojourn of three years in the Rocky Mountains, he had discovered a plant bearing a fibre fine as silk and, as he thought, definitely superior to cotton. He cultivated this plant and found that the pods grew to the size of a turkey or goose egg. Four pounds of silk and a quantity of seed were harvested. When Hart was returning to the United States he was robbed by the Indian Kiowas on the plains who stole the silk but left him the seed. He described the plant from which the seed was obtained and suggested that it might be cultivated on the St. Lawrence bottoms, Canada, and in Upper Canada. The plant to which Dr. Hart referred must almost certainly have been the showy milkweed, *Asclepias speciosa* Torr.

Professor Lawson replied to His Excellency Lord Monck stating that the seeds of the plant had been sown in the Botanic Garden at Kingston and that seeds had also been distributed to other members of the Botanical Society in various parts of Canada. He stated further that an examination of the seed showed the plant to be an *Asclepias* and then proceeded to describe some of the uses of closely related plants. He mentioned the use in India and in England of the silk-cotton obtained from *Calotropis gigantea*, the Mudar Plant of Bengal. He discussed the study which had been given to the use of *Asclepias incarnata* in Canada, and mentioned as well that certain Indian Asclepiads contained products similar to caoutchouc or gutta percha.

Professor Lawson considered that both *Asclepias* flax (stem fibre) and *Asclepias* cotton might ultimately become important materials of export from Canada. He stated that the cultivation of Asclepiads required "not a tithe of the field-labour necessary for the growth of common flax". Also accompanying Professor Lawson's letter were samples of Mudar silk-cotton from *Calotropis gigantea*, Canadian silk cotton from both common milkweed and swamp milkweed and Canadian *Asclepias* flax from swamp milkweed.

ALEXANDER KIRKWOOD

On February 15, 1867, Alexander Kirkwood, (1823-1901), read a paper on milkweed before the Ottawa Natural History Society. His paper (4) was subsequently published independently in Ottawa and has become one of the relatively rare early Canadian botanical publications. Kirkwood was appointed second class clerk in the office of the Commissioner of Crown Lands in Toronto on March 31, 1854. He evidently had extensive interests in the fields of agriculture and forestry as

indicated by the publication of a number of pamphlets on these subjects [3].

Common Milkweed —

Kirkwood discussed *Asclepias syriaca*, common milkweed, or *Asclepias cornuta* Decaisne, as it was known at that time. Following a detailed description of the plant he proceeded to enumerate its medical properties, pointing out that although it had been removed from the secondary catalogue of the U.S. Pharmacopoeia it was still used by regular practitioners. He quoted an analysis of the milky juice showing that it contained five parts of caoutchouc. He also mentioned the occurrence of asclepione in the juice. Various claims were cited that milkweed root might be used in treating scrofula and dyspepsia. It was supposed to have anodyne properties and to have been useful for asthma and in the case of typhus fever and accompanying catarrh.

Kirkwood next considered milkweed fibre as a textile material. He reported microscopic examinations of the fibre and comparisons with flax, wool, cotton and silk. He suggested that the fibre might be used in making warm cloth which was light, soft and pliable and also suggested its use in mixed fabrics.

Considerable attention was given to methods of cultivation but no actual experiments on cultivation were reported. It was suggested that the best soil would be a deep dry loam with a clay sub-soil. Kirkwood considered that it might be possible to cut the plant twice a year, in which case the first cutting would be done in June. In order to secure both the stem fibre and floss it was suggested that cutting should be done in September. The task of removing the seeds from the floss was considered to be one which could be "best done by hand round the fire-side in the long November nights."

This author intimated that the rubber from the stem might be useful suggesting that the green stems be crushed between rollers and the juice collected. "The profits resulting therefrom, may, however, remunerate him for his toil, as the juice thus obtained will thicken into a semi-elastic substance, and form a kind of caoutchouc. When evaporated and dry, it may be worked up in hot water with a wooden kneader, and will, no doubt, prove a valuable product, either alone, or mixed with other substances".

The process of retting and breaking the fibre was discussed at some length. Water retting and snow retting were both described as well as actual experiments conducted by the author.

The uses of the floss from the seed were also discussed, mention being made of cloth which had been prepared from it both with or without cotton, silk or wool. These had been exhibited in New York. The possibility of using milkweed in the paper industry was also mentioned. It was suggested that by the treatment known as "carroting" the milkweed floss might acquire felting properties and be used in the making of hats.

Kirkwood stated that no flowers were produced the first year milkweed was grown, but he gave estimates of yields and profits per acre as follows:

1st Year:
200 lb. fibre - 30 lb. tow - 600 lb. shoves $24.50

2nd Year:
300 lb. fibre - 50 lb. tow - 700 lb. shoves
200 lb. pod fibre - 200 lb. empty pods $58.00

3rd and Successive Years:
1st Cutting in June:
200 lb. fibre - 30 lb. tow - 600 lb. shoves $24.50

2nd Cutting in September:
200 lb. fibre - 30 lb. tow - 600 lb. shoves
200 lb. pod fibre - 200 lb. empty pods $46.50

These figures took no account of the cost of production.

Swamp Milkweed

Asclepias incarnata, called swamp silkweed, was also fully described. Kirkwood stated that it was sometimes employed in medicine being regarded anodyne and diaphoretic. He reported experiments in cultivation conducted by Robert Bell, Esq., of Carleton Place. Bell grew the plant from seed in the spring on dry ground reporting that it grew most luxuriantly, flowering, and

3. —Kirkwood, Alexander. Flax and Hemp. Printed at the steam press establishment of W. C. Chewett & Co., King St. East, Toronto, 8 vo. 79 pp. 1864?
Ibid. Algonquin Forest and Park, Ontario. Letter to Honourable T. B. Pardee, M.P.P., Commissioner of Crown Lands, Ontario. Warwick and Sons, Toronto. 8 pp. 1866.
Ibid. An Account of the Forest of Russia. By P. N. Werekha. 1873. Translated by Kirkwood. Warwick and Rutter, Toronto. 29 pp. 1896.
Ibid. The Art of Observing. A Fragment. 177. Translated by Kirkwood. Warwick and Rutter, Toronto. 1900.

coming to maturity the second year. He stated, however, that when the plants were about half grown a large number of caterpillars of the Archippus butterfly (*Danais Archippus*) appeared and destroyed some of the plants. Kirkwood considered that the preparation of fibre would be simpler from *A. incarnata* than from *A. syriaca* due as he says, to the lack of milky juice.

The reports of successful cultivation of *A. incarnata* on relatively dry ground have been justified by recent experiments despite many opinions (unsupported by experiment) to the contrary.

SAUNDERS

At the meeting of the American Pharmaceutical Association held in Boston, Massachusetts, September, 1875, William Saunders then of London, Ontario, presented a paper (5) dealing with the manufacture of rubber from common milkweed. William Saunders subsequently became the first Director of the Dominion Experimental Farms. He stated that experiments had been underway in London for a few years to demonstrate the fact that an elastic vulcanizable gum could be obtained from common milkweed. He gave details of experiments on methods of extracting the gum. These involved the fermentation of the plant material followed by extraction with an organic solvent. Many experiments indicated that the most satisfactory solvent was carbon bisulphide but he described a fire which occurred as a result of using this solvent. One experiment indicated that Saunders obtained a yield of gum of approximately 5%, the plants having first been fermented. He also stated that the gum obtained from the fermented material was superior in quality and elasticity to that obtained from the non-fermented material. He concluded "This elastic gum is vulcanizable, and it is claimed by some who have used it to be superior for some purposes to the ordinary rubber of commerce, being tougher, and possessed of more elasticity".

Literature Cited

1. Whiting, A. Geraldine. A Summary of the Literature on Milkweeds (*Ascelpias* spp.) and their utilization. *United States Dept. Agr. Bibliographical Bull.* No. 2, 41 pp. 1943.
2. Logie, Alexander. On the *Asclepias incarnata* L. as a fibre producing plant. *Ann. Bot. Soc. Canada* 1: 87-89. Paper read March 28, 1861, date of publication uncertain.
3. Communication from His Excellency Lord Monck, on a fibre plant suited to the Climate of Canada. *Ann. Bot. Soc. Canada* 1: 193-196. Date of publication uncertain.
4. Kirkwood, Alexander. A short treatise on the Milk-Weed or Silk-Weed and the Canadian Nettle, viewed as industrial resources. Printed and published by Hunter, Rose & Co., Ottawa, 1867.
5. Saunders, William. On the Manufacture of Rubber from a Milkweed. *Amer. Pharm. Assoc. Proc.* 23: 655-658. 1875.

CURRENT LITERATURE

SPECIES BATORUM. THE GENUS RUBUS IN NORTH AMERICA VII CANADENSES. *By L. H. Bailey. Gentes Herbarum Vol. V, Fasc. VII. pp. 465-503. pls. 211-228. February, 1944.*

This fascicle is a continuation of Dr. Bailey's monumental monograph on the genus Rubus. It treats Section 7, Canadenses, the smooth and the thornless blackberries. Seventeen species are described and, as in previous fascicles superbly illustrated with black and white drawings.

The following species from Canada and Newfoundland are included.....: *R. canadensis* in N.S., N.B., P.E.I., Que. and Ont.; *R. amicalis* in N.B.; *R. Kennedyanus* in Nfdl.; *R. Lepagei* sp. nov. in Que.; *R. quaesitus* sp. nov. in P. E. I. and N. B.; *R. ulterior* sp. nov. in Nfdl.; *R. russeus* sp. nov. in N. S.

—HAROLD A. SENN,

NOTES ON THE PALM WARBLER, *Dendroica palmarum* (Gmelin), IN CANADA.[1]

By A. L. RAND
National Museum of Canada, Ottawa

THE MATERIAL and notes that have accumulated in the National Museum provide additions to our knowledge of this species.

Dendroica palmarum hypochrysea Ridgway
Yellow Palm Warbler.

The 1931 A.O.U. Check-List, p. 293, gives the range of this form as including Ontario, but Lloyd (1924, *Can. Field-Nat.*, 38 p.14) identifies breeding birds from the vicinity of Ottawa as *palmarum* with *hyperchrysea* as a migrant. Baillie and Harrington, (1937, *Trans. Roy. Can. Inst.*, 21, p. 250) summarizing our knowledge of the breeding birds of Ontario says "our form is probably *palmarum palmarum*" presumably following Lloyd.

In the National Museum we have six birds in breeding plumage from Mer Bleue, near Ottawa, taken between May 28 and July 3. The species breeds at Mer Bleue and the specimens undoubtedly represent the breeding population. Mr. Lloyd (*loc. cit*) has already commented on these. With a much better series of *palmarum* from Manitoba for comparison, as well as a good series of New Brunswick specimens, Mr. Lloyd and I have gone over this material again with the following results:

In size the Ottawa series averages small ♂, wing 61, 63, 68 mm.; ♀ 60, 62, 63 mm. New Brunswick specimens (*hypochrysea*) give the following measurements, ♂, 65, 65, 66, 68, 69; ♀ 61, 62, 63, 63, 65 mm. While northern Manitoba specimens (*palmarum*) give the following wing measurements, ♂, 60 61, 62, 64, 66; ♀ 59, 60, 60, 61, 62. The size of the Ottawa series is hardly decisive. In colour the Ottawa series varies somewhat and is slightly intermediate between the pale western bird and the very much darker, yellower eastern race, but it is clearly much closer to the latter and should be included with *hypochrysea*. This appears to be the most westerly known breeding area of this race.

We also have three summer specimens of this species from the north shore of the Gulf of St. Lawrence. One, much worn, from Seven Islands, dated 29th May is similar to New Brunswick specimens; another taken the same place and date is slightly paler on the flanks but is clearly this form also (these were commented on by Lewis, 1938, *Can. Field-Nat.*, 52, p. 50). The third specimen, from the nearby Moisie Bay area taken July 6, is identical with Manitoba specimens, and is referable to *palmarum* (discussed below). In the light of present knowledge it appears advisable to consider *hypochrysea* as the breeding form in this area and *palmarum* a stray.

Dendroica palmarum palmarum (Gmelin)
Western Palm Warbler..

This race has been recorded as breeding as far west as central Alberta and the Mackenzie at Fort Simpson. During the past summer (1943) I found it a common summer resident, breeding, in northeastern British Columbia, 150 to 160 miles northwest of Fort Nelson along the Alaska Highway.

On the slopes above the Minaker River (a tributary of the Prophet River), in the drier country where the ground was covered with mosses and lichens and there were open stands of young spruce and pine, this species during my stop here, July 12-17, was found to be second in abundance only to the Slate-coloured Junco. Also common as summer residents in the same area were Myrtle Warbler and Chipping Sparrows, and a few Blackpoll Warblers. Being resident in numbers at this season was indicative of nesting, but in addition I saw an adult carrying food on July 13, and on July 14 I saw two well-fledged young.

This is a considerable westward extension of the breeding range of ths species.

No specimens could be collected at this time, but later in September, when I returned from farther north and stopped near where the Alaska Highway crosses the Muskwa River

1. —Received for publication March 3, 1944.

(near Fort Nelson) I saw two of these birds on Sept. 16, and collected one of them. They were evidently in migration, accompanying the common Myrtle Warblers and Juncos.

Fort Simpson appears to be the farthest north published record of this species. But that it occasionally straggles north to the Arctic coast, in fall at least, is shown by a specimen in the National Museum taken at Bernard Harbor, Dolphin and Union Straits, Sept. 28, 1915 by Frits Johansen. It is a typical fall example of this race.

Mousley (1924 *Auk*, 41 p. 584) recorded the first specimen of *D. p. palmarum* for the province of Quebec; a spring migrant taken May 13, 1922 at Hatley. This specimen is in the National collection, and though in poor condition is plainly referable to *palmarum* though with a slight tendency toward *hypochrysea*. In addition there is another specimen of *palmarum* from Quebec in the National Museum as mentioned above. It is a female in breeding plumage taken at Seal Cove near Moisie Bay, Saguenay County, on 16 July, 1928, by P. A. Taverner. Compared with Manitoba breeding material there are no significant differences; the wing measures 61 mm. This specimen compares so well with *palmarum*, and falls so far outside the range of variation shown by a series of 22 spring and summer specimens of *hypochrysea* from Ottawa and localities eastward, that it seems necessary to consider it a stray example of *palmarum*.

Forbush (1928, *Birds of Mass.* etc vol. 3, p. 272) gives the Yellow Palm Warbler as nesting in bogs and barrens, and similar open land with shrubbery and a few large trees; in Nova Scotia it also nests in both dry and wet habitats, as it does in New Brunswick (Phillip and Bowdish, 1917, *Auk*, 34, p.271). Lewis (1938, *Can. Field-Nat.*, 52, p. 50) records it nesting in sandy plains on the north shore of the Gulf of St. Lawrence; near Ottawa it nests in bog conditions. Apparently the Western Palm Warbler has been considered chiefly a bog nester (Forbush, op. cit. p.270 and Roberts, 1932, *The Birds of Minnesota*, pp. 244, 245), but my observations in northeastern British Columbia indicate that it too frequents both dry and wet habitats for nesting.

NOTES AND OBSERVATIONS

CLARKE'S NUTCRACKER, *Nucifraga columbiana*, AT BANFF. — It was on September 17th, 1930, that I first found Clarke's Nutcracker breaking up the cones of *Pinus albicaulis*, the white-barked pine, along the top of Sulphur Mountain, Banff, Alberta. By strong hammering to get the tough scales off the cone, it takes 24 to 36 such pecks to get the round seed. From the above date, it is difficult now to find a live cone; very ragged shells only remaining on the trees. Before 1930 the Richardson's squirrel (*Sciurus hudsonicus*) only cut down these cones and always left numbers of them on the trees. The squirrels get so much gum on the sides of their cheeks and it takes some time to rub it off on the branches of the trees, so that they are mostly content with the spruce and balsam fir cones of Sulphur Mountain. When a nutcracker comes anywhere near a squirrel cutting down one of these cones, it raises quite a racket and shows great excitement, even a feint at attacking the nutcracker, but the squirrel has to give way.

Clarke's nutcracker is found in numbers on Sulphur Mountain during August and September when the cones are ripening or ripe. As far as I know, on no other mountains, on which the white-barked pine grows, have the nutcrackers been at work on the cones. As the white-barked pine cone does not open and is very tough, both the squirrels and nutcrackers have to work hard to get the round seed, which is also eaten by the Indians or has been. Again, on September 30th, 1930, the Balsam Fir, *Abies lasiocarpa*, cones also were being broken up while on the trees, along the top of Sulphur Mountain. At least occasionally, the Clarke's nutcracker acts like a woodpecker on the stems of trees and also eats or rather swallows balls of cotton from the aspen poplar catkins. N. B. SANSON, BANFF, ALBERTA.

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CONTENTS

PAGE

A Northern Record of the Flicker and a Note on the Cline *Colaptes auratus* cl. *auratus-luteus*. By A. L. Rand 183
The Turkey Vulture in Ontario, North and West of Lake Superior. By A. E. Allin 185
News of Naturalists 186
Notes and Observations:-
Spring Field Excursion, Ottawa Field-Naturalists' Club. By J. A. Enstone 188
An Ontario Nest of the Evening Grosbeak. By O. E. Devitt 190
Two Moths from One Cocoon. By Charles E. Corfe 191
Rediscovery of *Corallorhiza odontorhiza*. By Monroe Landon 191
The W. E. Saunders Collection. By L. L. Snyder 192
Worm-eating Warbler and Parasitic Jaeger at Vineland Station, Ont. By Wm. L. Putnam 192
The Mute Swan in Ontario. By L. L. Snyder 193
Additional Grasses for the Ottawa List. By W. G. Dore and H. Groh 193
An Extreme Case of So-called "Injury-Feigning" by a female Ruffed Grouse (*Bonasa umbellus*). By C. H. D. Clarke 194
Remarks on A. L. Rand's "English Bird Notes" in Vol. 58, p. 68, 1944. By R. W. Sheppard 194
Distribution of the Cyprinid Fishes, *N. deliciosus* and *N. volucellus* in Ontario. By J. R. Dymond 195
Current Literature 184
Book Reviews 196
Index to Volume 58 197

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The Canadian Field-Naturalist

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A NORTHERN RECORD OF THE FLICKER AND A NOTE ON THE CLINE

Colaptes auratus cl. *auratus-luteus* [1]

By A. L. RAND

National Museum of Canada

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IN THE UNGAVA PENINSULA the flicker *Colaptes auratus* (Linnaeus) has been recorded north to Fort George, Lake Mistassini, Hamilton and Northwest Rivers and the vicinity of Davis Inlet (Macoun and Macoun, 1909, *Cat. Can. Birds*, p. 346, and Austin, 1932, *Mem. Nutt. Ornith. Club, 7*, pp. 151,2) with one record for the mainland near Akpatok Island (Turner, 1885, *Proc. U.S. Nat. Mus.*, p. 242). It also has been recorded from Greenland. It probably occurs generally north to the edge of timber, as it does in western Canada.

A second record for the eastern Canadian Arctic is provided by a specimen in the National Museum of Canada. It is a female taken at Cape Wolstenholme, Hudson Strait, in July, 1935, and has a wing length of 161 mm. It was taken by an Eskimo in July, 1925, and transmitted to the Museum by Mr. F. Melton.

The wing measurements (in millimetres) of summer (presumably breeding) adult specimens in the National Museum of Canada are as follows:-

	male	*female*
North Latitude 44° - 47°		
Nova Scotia		156
New Brunswick	160	160
Quebec	154	
Ontario	(8) 153-158 (av. 155)	152, 156, 157, 159
North Latitude 49° - 52°		
Manitoba	157, 159	(7) 154-160 (av. 156.1)
North Latitude 52° - 54°		
Manitoba	157	152, 158, 162
Alberta	(5) 153-164 (av. 159)	(5) 155-165 (av. 160.6)
North Latitude 54° - 58°		
Manitoba	155, 159	
North Latitude 58° - 60°		
Alberta		164
North Latitude 62° - 63°		
Quebec		161

Specimens from the western part of Canada showing a tendency in color toward the red-shafted flicker (*C. caffer*) are not included.

Ridgway (1914, *U.S. Nat. Mus., Bull. 50*, pp. 14-20) recognized three races of this flicker:

C. auratus auratus (Linnaeus) a small southern form; *C. a. luteus* Bangs, a larger central form, and *C. a. borealis* Ridgway, a still larger northern form. The fourth edition of the A.O.U. Checklist in 1931 did not recognize *borealis*. However, in 1939 Wetmore (*Proc. U. S. Nat. Mus., 86*, p. 191) recognized *borealis*, and gave its breeding range as from

1.—Received for publication June 9, 1944.

Alaska to Labrador, south from the limit of trees to the northern border of the United States from northern Minnesota to eastern Montana.

A survey of Ridgway's measurements and of the material in the National Museum of Canada indicates there is a gradual increase in size with increase in latitude, with an additional slight increase in the northwest.

This type of variation represents what Huxley has called a cline, and has suggested its designation thus *C. a.* cl. *auratus-luteus.* It also is an example of Bergmann's rule that larger forms occur in colder climates.

The size groups assigned to the three races, wing *auratus* 144-154 (av. 149.9): *luteus,* 154-165 (av. 156.3); and *borealis,* 156-170, (av. 162.9 mm.) are arbitrary.

For representing the variation in the species, and for designating populations it seems preferable to use but two sub-specific names: *auratus* for the smaller southern populations; and *luteus* for the larger northern populations, to which all Canadian birds belong.

CURRENT LITERATURE

THE SENSORY BASIS OF BIRD NAVIGATION. *By Donald Griffin, The Quarterly Review of Biology, 19, pp. 15-31, 1944.*

No completely satisfactory answer can be given to the question of how birds find their way. But Griffin, who has done a great deal of experimental work on the subject, including releasing birds far from home and attempting to follow them by aeroplane, here presents an admirable summary of homing experiments and their problems.

Some homing ability has been found in almost all birds tested, but it appears to vary in different species. It is concluded that many, but not all, homing experiments could be explained by assuming birds released in strange territory scatter at random and explore until they find familiar landmarks.

There is no direct evidence to support kinaesthetic theories, nor those involving sensitivity to the earth's magnetic field.

It is suggested that in finding their way in unfamiliar territory birds may use such clues as the relationship between geographical features, as rivers and coastlines near their homes and the direction of sunrise or conceivably of other celestial landmarks; the relationship between typical air masses, and prevailing winds, and topographical features may serve as clues; and relationship between familiar territory and features such as river systems, coastlines, or faunal zones, may also aid.

It is said that the combined use of such features seems more reasonable as an explanation of migration and homing, than the postulation of a new sense organ. There is a two and one-half page bibliography.

— A. L. RAND.

EXPERIMENTAL MODIFICATION AND CONTROL OF MOULT AND CHANGES OF COAT COLOR IN WEASELS BY CONTROLLED LIGHTING. *By T. H. Bissonnette and E. E. Bailey, Ann. N.Y. Acad. Sci., v. 45, art. 6, pp. 223-249, pls. 7. 1944.*

It is shown that in the short-tailed weasel (*M. cicognanii*) and the long-tailed weasel (*M. frenata*), in which normally two complete moults occur each year, (the white winter coat, where it occurs, is due to moult, not to a bleaching of the summer coat), the factor causing these moults is change in the amount of light. Reduction of temperature, or other factors that drive these animals underground where illumination is scanty, may indirectly influence the moults.

It is suggested that with the long-tailed weasel in which a white coat is assumed in some areas, while the winter coat is brown in others, there are local physiological races, produced by natural selection.— A. L. RAND.

THE TURKEY VULTURE IN ONTARIO, NORTH AND WEST OF LAKE SUPERIOR[1]

By A. E. ALLIN
Fort William, Ontario

ROWAN, (1922) reported the turkey vulture (*Cathartes aura septentrionalis*) breeding in the Lake of the Woods region of western Ontario. Baillie and Harrington (1936) reviewing its status in Ontario, recorded that a pair nested in 1919 on Thompson's Island, Lake of the Woods, Kenora District, and that "nests have been found by Indians according to (the late) J. D. Jacob" in the eastern portion of Rainy River District. Snyder (1938) in reporting the results of field work carried out by an Ontario Museum of Zoology party during the summer of 1929 in western Rainy River District reported that a turkey vulture had been taken alive on the shores of Rainy Lake about the middle of July. It has been recorded as a visitor to northern Ontario by Fleming (1903) — a bird noted at Moose Factory in 1898, and by Norris-Elye (1932) who recorded one observed far to the north, at Fort Severn in the summer of 1931.

For many years a nature article, "Chickadee Notes", has appeared in the Winnipeg Free Press. Excerpts from these columns, concerning the turkey vulture, have been provided through the courtesy of their author, A. G. Lawrence. In the article for July 15, 1926 we read, "Mr. Garson states he has seen flocks of five and six turkey vultures for a number of seasons at the Lake of the Woods" and "some years ago discovered in that area, two young in a crevice" and B. C. Brough located a nesting cavity containing two full-grown young in the last week of July 1919." (This is the breeding record cited above by Baillie and Harrington). The June 28, 1928 column reported: "Bruce Warner reports as many as nine of these birds have been seen at one time on a small tributary lake about 20 miles from Fort Frances ..... and a pair of turkey vultures have nested in a crevice in the rocks on an island in Rainy Lake for the past five or six years." On May 13, 1938, Lawrence wrote "they (turkey vultures) appear somewhat commoner in western Ontario" (than farther west). Finally we read in the June 5, 1942 column: "In the Kenora District, Ontario, ... on Big Pine (lake) they noticed six turkey vultures soaring." To these observations we can add the following: On September 10, 1943, near Nestor Falls, Kenora District, "the bus stopped so that the passengers might watch 16 birds, twice the size of crows, and with red heads, feeding on a dead animal on the road," according to our informant, Mrs. H. W. Fawcett, a passenger on the bus. The date is somewhat early for this to have been a flock of migrating vultures. Probably they had gathered from the surrounding region to feed on the carrion. Two observations of turkey vultures in areas outside its apparent centre of abundance should be recorded. The Fort William Daily Times-Journal, August 29, 1941, reported: "Joseph Parenteau shot a turkey buzzard in Wabigoon last week. The bird .... is very rare in this part of the country". (Wabigoon is in Kenora District about 100 miles east of Kenora and the same distance north-east of Fort Frances). Also in the summer of 1941, Dr. and Mrs. P. M. Ballantyne, Port Arthur, saw a turkey vulture near Hurkett, 50 miles north-east of Port Arthur. It is apparently the first time the turkey vulture has been observed in the District of Thunder Bay.

SUMMARY

The literature has been reviewed and further evidence has been presented to show that the turkey vulture is a fairly common summer resident of certain portions of western Rainy River and Kenora Districts, and of casual occurrence in the remainder of the territory north and west of Lake Superior.

Literature Cited

Baillie, James L. Jr., and Harrington, Paul, 1936, The Distribution of Breeding Birds in Ontario. Part 1, *Trans. Roy. Can. Inst.*, 21, 19.

Fleming, J. H., 1903, *Auk*, 20, 66.

Norris-Elye, L. T. S., 1932, *Can. Field-Nat.*, 46, 142.

Rowan, William, 1922, *Auk*, 39, 224-232.

Snyder, L. L., 1938, The summer birds of western Rainy River District, Ontario. Part 1, *Trans. Roy. Can. Inst.*, 22, 183.

1.—Received for publication July 8, 1944.

NEWS OF NATURALISTS

Dr. Oliver H. Hewitt, formerly Instructor in Ornithology and Game Management, Cornell University, Ithaca, N. Y., has recently been appointed to the position of Chief Federal Migratory Bird Officer for Ontario and Quebec, with headquarters at the National Parks Bureau, Ottawa. Dr. Hewitt, is a graduate of McMaster University, and a former resident of Hamilton, Ontario.

Mr. J. A. Munro's summer investigation included studies of waterfowl nesting grounds and food, and mammal populations in the regions east and west of Quesnel, the region north of Prince George to Chief Lake and Summit Lake, Francois Lake and the Bulkley Valley west to Hazelton, B.C.

A news item from Pittsburg, Pa., November 6, 1944, announces that the Carnegie Museum will have an expedition in the Labrador Peninsula next year. W. E. Clyde Todd and J. Kenneth Doutt plan to travel from Povungnituk Bay, on the east side of Hudson Bay, to Payne Bay, studying the birds and mammals of the area.

SASKATCHEWAN RODENT PLAGUE SURVEY

A two-man crew, Messrs. W. A. Fuller, Department of Biology, University of Saskatchewan and D. MacDonald, Division of Sanitation, Department of Public Health, Regina surveyed the southern part of the province of Saskatchewan for the presence of infectious diseases carried by native small mammals and capable of being transmitted to man. These include bubonic or sylvatic plague, Rocky Mountain spotted fever, tularaemia and encephalitis.

The survey was divided into two parts, namely, a tick survey lasting from May 15 to July 1 and a rodent survey from July 2 to September 23. A total of 3600 ticks were collected, mostly by the standard "drag" technique, and sent to the Laboratory of Hygiene, at Kamloops for guinea pig inoculation tests. Two samples, both collected at Carlyle Lake, proved positive for tularaemia. The tick concerned is *Dermacentor variabilis* the American dog tick, but no mammal host was discovered.

Some 1350 ground squirrels, *Citellus richardsonii*, were collected plus about 75 other small rodents and carnivores, during the rodent survey. These were all autopsied in the field and ectoparasites and pooled tissues were sent to Kamloops for guinea pig inoculations. Nearly 10,000 fleas were sent for inoculation and about 200 more for taxonomic purposes. No positive reports have been received.

FISHERIES INVESTIGATION OF GREAT SLAVE LAKE

Professor D. S. Rawson of tthe University of Saskatchewan, assisted by Dr. J. G. Oughton of the Royal Ontario Museum of Toronto, and Messrs. P. Larin and E. Reich, biology students at the University of Saskatchewan, carried on an investigation of the fisheries of Great Slave Lake from mid-June to mid-September.

Living quarters and a laboratory were on a barge. The fish population was sampled, specimens were taken for scale counts, stomach examination, parasites and taxonomic studies. Soundings were taken, and the water and bottoms examined. A comprehensive report is being prepared.

Lieut. T. H. Manning, R.C.N.V.R., in connection with other work, travelling along the east side of Hudson Bay, made studies and collections of birds and mammals during the 1944 summer season. The collections will be divided between the National Museum of Canada and the Royal Ontario Museum of Zoology. With Lieutenant Manning was A. R. A. Taylor who collected plants that will go to the University of Toronto.

The National Museum of Canada had a field party making a survey of the Canol Road during the summer season of 1944. It consisted of A. E. Porsild, assisted by August Breitung, studying plants; and A. L. Rand, assisted by W. H. Bryenton, studying birds and mammals. Travelling by truck, they made camps at intervals along the road on the western slope of the Mackenzie Mountains between Teslin Lake and the Yukon boundary. Late in the summer a rapid reconnaisance

trip was made over the eastern half of the road, to the Mackenzie.

Extensive collections and notes were made that are deposited in the National Museum.

Dr. C. H. D. Clarke, formerly of the Northwest Territories Administration, and T. M. Shortt, of the Royal Ontario Museum, conducted bird and mammal studies in southern Yukon and the northwest corner of British Columbia. They worked along the Haines Road, travelling by motor truck, and in the Klondike area. Besides securing sizeable collections that will be divided between the National Museum and the Royal Ontario Museum, Shortt made many sketches.

Robert H. Smith, Mississippi Flyway Biologist of Fish and Wildlife Service, spent the summer studying wild fowl on the west side of Hudson Bay.

Dr. A. A. Allen of Cornell University, accompanied by his son David, was studying and photographing birds at Churchill during the month of June.

Dr. Ian McT. Cowan,of the University of British Columbia conducted studies of large mammal populations and their parasites in National Parks in the Rocky Mountain area, for the National Parks Bureau.

Lieut. T. H. Manning Honored:

A Committee of the Royal Society of Edinburgh, the Royal Physical Society, and the Royal Scottish Geographical Society awarded Lieut. T. H. Manning, R. C. N. V. R, the W. S. Bruce Memorial Prize for 1944 for his outstanding work in survey and biology from 1931 to 1939 in Iceland, Lapland and the eastern Canadian Arctic.

Dr. C. H. D. Clarke, who since 1937 has been engaged in special wildlife investigation for the Department of Mines and Resources and who has visited most of our National Parks and travelled extensively in the Northwest Territories and Yukon Territory in connection with his work, has recently accepted a position in the Department of Lands and Forests of the Ontario Government. He will continue to carry on a similar work in the province.

J. Dewey Soper, National Parks Bureau, Winnipeg, participated in field work for the Dominion Government, during the summer of 1944, under the North Pacific Planning Project. His inquiries chiefly comprised faunal investigations, with specialization in big game and fur-bearing mammals, and waterfowl populations. Four months were spent on these studies, from early May until early September. Most of this time was devoted to the Grande Prairie-Peace Region west to the British Columbia boundary. Some investigations, however, were carried out as far south as Torrens River, Rocky Mountains, north to Clear Hills and Flood Lake, and as far east, under the above project, as Baptiste Lake, near Athabaska.

Dr. Hugh M. Raup of the Arnold Arboretum, Harvard University, this summer led a second expedition to the Alaska Highway. The party included Frederick Johnson, of the Peabody Foundation for American Archaeology at Andover, Mass.; Lucy C. Raup, botanist; John H. H. Sticht, of the department of geology, Harvard University; Dr. Stuart K. Harris, of the department of biology, Boston University, and Karl and David Raup.

Most of the season was occupied with botanical, geological and archaeological surveys between Whitehorse, Y.T., and Fairbanks, Alaska.

NOTES AND OBSERVATIONS

SPRING FIELD EXCURSION, OTTAWA FIELD-NATURALISTS' CLUB. — The Ottawa Field-Naturalists' Club made its last spring excursion of the year in the afternoon of Saturday, June 17, 1944.

After walking across the City of Ottawa from a point in the south-eastern corner of the town, I joined the other members at the meeting point which was Wellington Street at Holland Avenue. Dr. Pauline Snure welcomed me to the group with a smile and asked me with which party I wished to walk. I elected to walk with the bird lovers; I prefer animation to inanimation. Bird men walk faster than flower men; I prefer rambling to standing or stooping. Some of the botanists had started out along the route but some were still in the group with the unorganized bird men and the geologists. A young man was exhibiting prints of a picture of last Saturday's group as they reclined on the grassy edge of the hardwoods and took their supper. Miss Brewer was going to lead a party. Dr. Snure introduced us to each other. Miss Brewer, in turn, introduced me to Mr. Cooch, a young student of birds who was both accomplished and enthusiastic, and to Mr. and Mrs. Jarrett.

We began to walk along Holland avenue at 3.25. This is the direction in which lies the Ottawa river and a large unsettled tract of land bordered by the C.P.R. tracks on its southerly edge and the Ottawa river on its northerly one. All this area was unknown to me even though I am one of those rare birds, native Ottawans. The botanists would say of me, "He is indigenous to this country."

Within five minutes of our departure, we saw a robin and heard a song sparrow jingling in the scrubby bush along the east sidewalk. This was at the beginning of Holland avenue in Scott street. Here we heard a cowbird whistling from the railroad and saw a chimney swift flying at a fair height directly overhead. Mr. Cooch's sharp eye had picked him out from the clouds. We turned westward and walked along Scott street to Ross avenue along which we walked northward across the railroad and through open country toward the Ottawa river. Some members of our party saw a tree sparrow on Scott street but I missed it. As it runs through these fields Ross avenue is a rocky cart track dusted with the fine powder produced by the pulverization of the small road metal and the place rock which shows here and there. The trees, with few exceptions, have been felled and removed. Only odd clumps of elm and basswood thrust up their trunks above the general level of shrubs and low trees and tall weeds. A mass of alders lay to our right.

Soon after we entered this wilderness, a bronzed grackle carrying a morsel in its bill winged overhead. I saw it again on the return and entered into a discussion with a fellow as to the colour of its bill. He stated that the European starling is the only member of the family which has a yellow bill and inferred that the yellowness on this bird must be the bird's baggage. I said that the bronzed grackle had a distinctly coloured eye but I was not sure as to its yellowness. Since then, I have learned from McIlwaith's book, *Birds of Ontario*, that its iris is sulphur-yellow. This bird's boat-shaped tail, that feature which strikes the fancy in every bird lover, did not show to advantage. The tail feathers were bedraggled.

The party now gathered around Mr. Cooch, who had sallied west of the road to view at close range a rose-breasted grosbeak which moved in the top of a basswood clump. As each successive member of the party caught sight of this rare bird, a squeal or cry of delight arose toward the bird. I must have been the only one who did not yell my halloo. That was because I failed to pick it out on its lofty perch from among the leaves. I saw the bird only in flight over my head when its white underwing patches showed plainly: I therefore could not distinguish its most attractive feature, namely, the roseate breast. I must watch assiduously for this bird and listen for its melodious song, far sweeter than the robin's song which it resembles.

When the leaders called out the presence of a yellow warbler in a clump of low basswoods, I padded through the grass to see it. We looked and watched for this shy little bird but most of us failed to see it. Some sorrowfully trailed the leaders without having seen

it and left only five of us still searching. When the three ladies left, only my acquaintance of the roadway and I remained. Little yellow bird now gained boldness and showed herself to me. I had the pleasure of pointing her out to my companion. Her beak was long proportionately to her body, say ⅝ to ¾ of an inch in length. Her body was greenish yellow and her wing was striped olive green. I liked her eye which stood out like a little black or blue bead. She flitted from branch to branch of the basswood clump, sometimes hidden behind the large leaves, sometimes camouflaged in front of them by the blending of her colours with their light fresh green. She uttered a single call note at fairly regular intervals as if she were warning a brood of young ones nearby of our presence.

A tree swallow soared overhead and dipped north-westward.

My companion and I left the shrubs and long grasses, returned to the road, and sauntered along the hot and dusty trail, across this wild and forlorn plain with no majestic towering trees to pull our glance upward, possessed only of head-high bushes which hemmed our vision and straitly bounded our thoughts. My companion identified himself as Jim Forsyth of the teaching staff of the High School of Commerce of Ottawa. Our conversation turned toward his subject of teaching, namely, sociology, and toward the amicable interrelationship of student and teacher which exists at that school.

After the confinement of the plain and cart track, our debouchment on the river's shore with its broad prospect across sparkling, dashing rapids gave a thrill to my heart, a lift to my thoughts. The dark, roiled waters of the Ottawa scampered headlong over slippery rocks and tossed themselves from their shallow bed into the air, white with delight and merry in mischief. A fine, cool, refreshing breeze came in from across the rolling river and dispersed the dust and memory of the cart track.

Our planned route lay downstream across broad, bare, flat outcrops of rock and streams now going dry. A purple martin hen strutted up the road ahead of us and took to flight at our approach. It landed to our left, on the rocky and pebbled beach, only thirty feet away. It fed on shore-bits picked up among the pebbles and walked in search of its food with a mincing, teetering gait. Its high shoulders tottered and thrust themselves forward. It had a greyish belly, a dark grey throat, and handsomely purplish head and back. Around it circled in flight several tree swallows which fought wind and the martin hen.

Far across the waters, a herring gull dipped and rose against the wind.

We turned inland and investigated the calls and song of a catbird from a haw thicket. I could not find the mocking music-maker but saw a juvenile robin in the hollow center of the thicket. It stood on a stone, quietly, and held up its big-mouthed face and displayed its long cheeks wrinkled like an old woman's cheeks. It had the countenance of a wizened and sanctimonious parson with a long, spotted weskit. It kept its front to me lest I see its docked tail. In spite of its precaution, I did see its stubby tail when it flapped shakily away from me. A song sparrow jingled its defiant ringing song from the low trees back of me.

Near our thicket, we stooped to examine several flowering plants which Miss Brewer later identified for me as bed straw, lady's thumb (with its blotch of blood on the leaf), bladder campion, and stone crop, which is a small yellow flower of the live-for-ever family.

We returned to the river and sat on its rocky shore. We watched the bathers, listened to the river's plaint, and saw a duck, probably a black one, beating its way upstream only a few feet above the water. Here the leaders explained the finds of their several parties. I regretted that I had not seen the hackberry tree which the botanists under Mr. Groh had found. This leader exhibited its most asymmetrical leaf which has that attribute in a much greater degree than even the elm, to which it is related. When I arose and walked back to the town with Mr. Cooch, I finished my participation in the last excursion of the Field Naturalists' Club during the spring of 1944 and felt remorse at not joining the walkers in the earlier rambles. The finest pleasures in life's bounty slip down-stream while I drift in littoral eddies or grasp at slimy boulders. — J. A. ENSTONE, OTTAWA.

NOTES AND OBSERVATIONS

AN ONTARIO NEST OF THE EVENING GROSBEAK.— During the past twenty-five years there has been a gradual eastward extension of the summer distribution of the eastern evening grosbeak (*Hesperiphona vespertina vespertina*) in Ontario. By the summer of 1935, the species had appeared at Haliburton, Haliburton County and by 1939, had reached Leeds County and the St. Lawrence River (Baillie, 1940).

The first evidence of breeding for the province was established in 1920 when Rowan (1920) observed an adult with young "clamouring for food" on July 24 at Indian Bay, in extreme western Ontario. On August 5, 1920, Ralph E. and Justin S. DeLury (1922) saw an adult female feeding two young out of the nest near Ingolf, adjacent to the Manitoba boundary. Since that time and following a general eastward trend, observations of young have been reported by MacLoghlin (1932) at Bella Lake, Muskoka District and by Baillie and Harrington (1937) at Kenora, Port Arthur, Pickerel Lake, Bachawana Bay and Bigwood. McLulich (1938)' mentions young as being seen in Algonquin Park during the years 1932 to 1935. These repeated observations of young birds attended by parents furnish ample evidence of the extent of this species breeding range in the province but the finding of an actual nest has long proven an enigma to even the most active ornithologists.

On June 3, 1944, a nest of the evening grosbeak was found by Mrs. I. V. Earle at Clear Lake, in northeastern Haliburton County, seven miles south of Whitney. A letter from Mrs. Earle to Dr. Harry E. Hobbs of Toronto told of the discovery, apparently the first nest of this species to be reported for Ontario. The writer accepted Mrs. Earle's invitation to visit the location and accompanied by Mr. W. W. Smith had the pleasure of corroborating the find on June 20. An extract from Mrs. Earle's letter of June 6 should prove of interest. It reads: "In the light of the invasion news my news will stand out like the light from one tiny candle on a birthday cake, but I have found an evening grosbeak's nest very much occupied. It seems as if there should be several nests in this vicinity for we have counted as many as twelve male birds at one time imbibing sodium chloride cocktails at "Ye Olde Rotten Stump Bar" in front of the kitchen window. At first there were several females there too but recently they appear singly accompanied by friend husband who eats nothing himself but stands guard over the female, driving every other bird away until she has eaten her fill. I have been on the lookout for a nest for a long time and when the females stopped coming down in numbers I thought they must be nesting so started looking in earnest. I have noticed that when they are coming down out of the bush they keep calling to one another, so taking that as a clue, I went down the trail to the west and into the bush where I heard some birds calling. About 50 ft. up in a scraggy old cedar tree not far off the trail I saw what looked like a pile of twigs in a crotch close to the trunk of the tree. I studied it with the bird glasses and was convinced that it must be a nest. So after having practically taken a bath in fly dope I settled down for a vigil. My vigil was rewarded fairly soon when I heard some calling and along came a male and a female straight to the nest. She lit on a branch right over the nest and flew down into it and settled herself with much fluttering of her wings, while he sat on a branch right next to the nest and inquired as to her comfort. The field glasses showed them up so plainly that it seemed as if I could touch them and left no doubt as to who lived there. I think she must be laying for she leaves the nest for too long a time to be hatching eggs. I keep the old stump well wet up with a saturated solution of salt (no free particles) and it surely does attract them."

At the time of our visit (June 20-21) the nest contained half-grown young whose tiny heads could be seen protruding above the rim of the nest each time they were fed. According to Mrs. Earle, the adults were first noticed feeding the young on June 13. The position of this particular nest is at variance with others of this species found in Michigan by Ligon (1923) in that it was placed in a crotch formed by a small branch, *snug against the trunk*, approximately fifty feet above the ground. The rather bulky nest was quite visible from the ground and appeared to be composed mainly of small twigs and

grasses. Since the old cedar holding the nest was too unsound to bear one's weight the writer climbed a balsam fifteen feet from the nest-tree and was able to take several photographs of the parents as they came to feed the young. It was noted that the adults always approached and left the nest-tree together. Invariably the female fed the young first to be followed in a few seconds by the male. On several occasions only the female did the feeding. Following the feeding both birds would rest for a few moments then fly away together. During our period of observation of about two hours the young were fed on an average of every fifteen minutes. The usual food offered appeared to be a species of grub or larva which the parents picked off nearby conifers. While in the vicinity of the nest the adults uttered a more subdued, but similar, note to the usual whistled "cheep".

Although the general vicinity was searched for other nests of a possible colony, none was found. However, such nests undoubtedly exist within a reasonably short distance of the Earles' home since on June 21, we counted thirty grosbeaks, mostly males, feeding on the salt impregnated wood of a rotten stump at the side of the house.

The writer is indebted to Mrs. Earle for permission to report this unusual nest.

LITERATURE CITED

Baillie, James L. Jr. and Paul Harrington. 1937. The distribution of breeding birds in Ontario. *Trans. Royal. Can. Inst.*, **21**: 199-283.

Baillie, James L. Jr. 1940. The summer distribution of the eastern evening grosbeak. *Can. Field-Nat.* 54:23.

DeLury, Ralph E. and Justin S. 1922. Occurrence of immature evening grosbeaks in Ontario. *Can. Field-Nat.*, **36**:137.

Ligon, J. Stockley. 1923. Nesting of the evening grosbeak in northern Michigan. *Auk*, **40**:314-316.

McLoghlin, Anna E. 1932. Evening grosbeak seen feeding its young in Muskoka. *Can. Field-Nat.*, **46**:68.

MacLulich, D. A., 1938. Birds of Algonquin Provincial Park, Ontario. *R.O.M.Z. Contrib. No.* **13**: 39-40.

Rowan, Wm. 1920. *Auk*, **37**:585-6.

— O. E. DEVITT, TORONTO.

TWO MOTHS FROM ONE COCOON.— There has recently been received at the Royal Ontario Museum of Zoology through the courtesy of Dr. E. M. Walker, two specimens of *Automeris io*, male and female, which had emerged from one cocoon. The cocoon containing two empty pupa skins was included. These specimens were sent to Dr. Walker by Mr. Bruce Metcalfe, Thistletown, Ontario who has kindly informed us that the cocoon was collected in the field by a collegiate student, brought to school and the specimens emerged in a cage (exact date unknown). The two moths are quite normal, the male rather small. In many years of collecting and working among Lepidoptera, I have never heard of a similar case and would like to discover whether it is a record or otherwise. — CHARLES E. CORFE, DIVISION OF INSECTS, ROYAL ONTARIO MUSEUM OF ZOOLOGY.

REDISCOVERY OF CORALLORHIZA ODONTORHIZA.— On October 3, 1935, after several efforts, I found a colony of the Autumn Coral Root, *Corallorhiza odontorhiza* on Lot 20, Sixth Concession of Charlotteville in Norfolk Co., Ont. Unfortunately this colony disappeared when the woodlot was cut two years later.

On September 17*th* of the present year (1944) I was fortunate enough to discover it again in my own woodlot, six miles from Simcoe. Macoun reported finding this species "north of Lake Erie" in the 1880's but so far as I know there has been no record lately. Frank Morris was unable to find it in Ontario when preparing his book on "Our Wild Orchids." —MONROE LANDON, SIMCOE, ONT.

NOTES AND OBSERVATIONS

THE W. E. SAUNDERS COLLECTION.— Final arrangements for the disposition of the zoological collection of the late Dr. W. E. Saunders are now complete. The following particulars have been brought together for record. Not every specimen was numbered and registered in the Saunders' catalogue, consequently exact figures are not available but those given are approximately correct.

MAMMAL COLLECTION. — The mammal collection contained an approximate, all-time total of 3,000 specimens. Over the years Dr. Saunders gave 1,587 to various schools, teachers and other individuals, for educational purposes.[1] After his death 163 specimens were given to the University of Western Ontario, London. The remainder, totalling approximately 1,250 specimens, was bequeathed to the Royal Ontario Museum of Zoology. About 100 species, mostly rodents, are represented in the portion now in the Royal Ontario Museum of Zoology.

BIRD COLLECTION: *Skins.* — An approximate total of 4,700 specimens comprised the all-time collection of bird skins. Donations for educational purposes amounted to 1,370. In addition, during the year 1919, he presented 975 specimens to the National Museum of Canada[2] and in 1931 he made a donation of 280 specimens to the University of Western Ontario. The remainder, 2,075, was bequeathed to the Royal Ontario Museum of Zoology where it is now housed. This latter portion contains representation of 475 species of birds. It includes the many varities and historic record specimens collected by Saunders during his long and active life.

Eggs and Nests. — This collection comprised 1,494 sets of eggs representing 382 species. It was bequeathed and delivered to the Royal Ontario Museum of Zoology.
— L. L. SNYDER, ROYAL ONTARIO MUSEUM OF ZOOLOGY, TORONTO.

1.—Also about 140 mammal skins were given to the National Museum of Canada.
2.—Not the R.O.M.Z., as recorded by Dale, Can. Field-Nat., 57: 100. 1943.

WORM-EATING WARBLER AND PARASITIC JAEGER AT VINELAND STATION, ONT.— On May 4, 1944, a worm-eating warbler (*Helmitheros vermivorus* (Gm.)) was discovered in the shrubbery along the small creek which flows through the Horticultural Experiment Station at Vineland Station, Ont. The writer observed it carefully with six-power glasses at a distance of twenty-five feet for about five minutes as it worked through the lower shrubs about a foot from the ground, until it finally took fright and was lost among the dense growth.

Six days later, on May 10, what was presumably the same bird was seen about seventy-five yards from the first location, as it flew from a dense clump of spruce into a small plantation of young Scotch pine. For at least ten minutes it fed on the ground among scattered weeds or ascended the lower dying branches of the pines, giving the writer every opportunity to note the characteristic head markings.

Jaegers appear to be sufficiently uncommon in Ontario to be worth recording. On October 13, 1942, the writer was watching the gulls which were gliding along in the updraft from the lake bank at the Experiment Station, when a strange bird dashed into the field of the glasses in pursuit of a ring-billed gull. It was at once recognized as a jaeger, and remained in view long enough to permit noting the details of tail and colouration. Later comparison of descriptions and colour plates in several reference works showed it to be a parasitic jaeger (*Stercorarius parasiticus* (L.)) in light phase. This is apparently the first record of the species from Lincoln County.

About half a mile west of the Experiment Station, another jaeger was seen on September 13, 1943, but it was too distant to reveal the specific characters. It appeared to be in light phase.— WM. L. PUTNAM, VINELAND STATION, ONT.

NOTES AND OBSERVATIONS

THE MUTE SWAN IN ONTARIO.— The occurrence of a mute swan (*Sthenelides olor*) in the vicinity of any large community or estate could be assumed to be the result of some local escape and would deserve no particular comment. A specimen of this species now in the collection of the Royal Ontario Museum of Zoology represents an occurrence which cannot be so summarily dismissed. The bird, an adult, was collected on Long Point Bay, Norfolk County, Ontario by Mr. John Bachus, Jr. of Port Rowan in late October, 1934. It possessed no marks of captivity. Both wings are normal though the swan was apparently in a flightless stage since the chord of each wing measures approximately eighteen inches, not twenty-four or more which would indicate full development of the primaries. According to breeders of this species there is nothing irregular about the bird being flightless in October.

The point of interest in connection with this Ontario-taken mute swan is that it cannot be assumed to be a local escape since no captive stock is known to be kept within fifty or more miles of the situation where it was captured. In fact, Long Point Bay is about as close to areas where Mute swans have been reported as feral birds as it is to where captive stock of the species is retained.

The 1931 Edition of the American Ornithologists' Union Check-List makes the general statement that this species is naturalized in New York State (lower Hudson Valley and the south shore of Long Island) and that casual strays occur on the coast of New Jersey. Poole[1], Black[2], and Hicks[3] report occurrences of mute swans in Pennsylvania, Illinois and Ohio (and West Virginia) respectively. Although the report of Hicks concerns the liberation of swans in Ohio in the autumn of 1934, the year the Ontario bird was collected, the context of his note indicates that the latter could not have been from that flock.

An unrecorded occurrence based on a sight observation at Hamilton, Ontario, since 1934, could not be explained as a local escape. The specimen here recorded and the Hamilton report would appear to make it necessary to deal with the name of this species in any future list of Ontario birds. List-keepers are plagued with numerous histories of occurrence which show every degree in suport of validity or invalidity. The case of the mute swan is not clear-cut or of any particular importance but neverthless the name should be included in any compendium purporting to be complete.— L. L. SNYDER, ROYAL ONTARIO MUSEUM OF ZOOLOGY, TORONTO, ONT.

1.—1929, Auk, 46: 536
2.—1934, Auk, 51: 100
3.—1935, Auk, 52: 301-2

ADDITIONAL GRASSES FOR OTTAWA LIST[1].— Further collecting in the region within a 30-mile radius of Ottawa has yielded the following names to supplement our list published earlier (*Can. Field-Nat.* 52:53-55, April 1938).

**Agropyron cristatum* (L.) Gaertn. — persisting since 1941, sandy highway shoulder, Dow's Lake.

Bromus Dudleyi Fern. — Wakefield.

**Cynosurus cristatus* L. — introduced in lawn seedings, Ottawa.

Deschampsia flexuosa (L.) Trin. — sandy land, Constance Bay.

**Festuca capillata* Lam. — in lawn, Ottawa.

**Festuca elatior* L. var. *arundinacea* (Schreb.) Wimm. — roadside, Deschênes.

Glyceria canadensis (Michx.) Trin., var. *laxa* (Scribn.) Hitchc. — Eardley.

**Hordeum vulgare* L.—persisting after cultivation.

Muhlenbergia uniflora (Muhl.) Fern. — bog, Eardley.

Panicum linearifolium Scribn. Britannia.

**Setaria verticillata* (L.) Beauv. — city streets, Ottawa; troublesome in Westboro garden.

Some additional stations for species rare in the district may also be mentioned.

Anthoxanthum odoratum — moist meadow Arboretum, Experimental Farm.

Bromus Kalmii —Constance Bay and Almonte.

Phragmites communis — ditch, Bowesville. —W. G. DORE AND H. GROH, OTTAWA.

1.—Contribution No. 795 from the Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa, Canada.

NOTES AND OBSERVATIONS

AN EXTREME CASE OF SO-CALLED "INJURY-FEIGNING" BY A FEMALE RUFFED GROUSE (*Bonasa umbellus*).— On July 27, 1934, at Brule Lake, Algonquin Park, Ontario, while engaged in an intensive study of a ruffed grouse population, I observed a female ruffed grouse behave in a manner unique in my experience. Its action surely belongs in the "injury-feigning" category, but the first of these words hardly goes far enough and the second is a teleological expression the use of which is scarcely conducive to the elucidation of problems of bird behaviour. This observation bore no relation to the problems with which I was concerned and was omitted when the results of my efforts were published (*Un. of Tor. Studies Biol. Series No.* 41, 1936).

I was walking along an open trail when a female ruffed grouse suddenly started to cluck and walk away from the trail a few feet ahead of me. Her behaviour was typical of "broody" female grouse. She had certainly seen me coming and her young, which were well grown, had had time to slip out ahead of me. This family was one of a number that I had had under close observation and I was very anxious to get a count of the young. The only way to do this was to dash madly into the brush ahead in the hope of flushing them. I had made two steps towards the accomplishment of this purpose when the female flew a few feet and came down on the bare ground under a cedar tree, beating her wings exactly like a bird that has been shot and is dying. The body moved about on the ground, breast down, head and feet limp, in a manner that needs no description to grouse hunters.

For a few seconds I stood still in fascination. Into my mind there flashed stories that I had heard of the behaviour of snowshoe rabbits in northern Canada during times of dying-off of how fat and apparently healthy animals would suddenly topple over dead when they were flushed. Perhaps this was similar! Then, when it seemed that the death struggle would take the bird to a hole leading under the cedar tree, I darted forward to seize her. Just as I stretched out my hand she took off in full flight. My chagrin was considerable, and it was too late to do anything about counting the young birds.

The "broken-wing behaviour", combined with a great deal of clucking and a variety of threatening postures and noises, was commonly exhibited by grouse in this area, especially before the young were able to fly. As the young grew and became able to disperse rapidly such behaviour became less common. I might add that I have found with spruce grouse that a good imitation of the call of the downy young will induce threatening postures on the part of a female after her young are on the wing and have ceased to give the notes in question. I have never tried this out on ruffed grouse. By July 27th young ruffed grouse had been flying for three weeks. Although the individual ruffed grouse concerned in the incident that I have described was observed many times, as were other individuals in the same area, the behaviour described was observed on the one occasion only.

— C. H. D. CLARKE, TORONTO

REMARKS ON A. L. RAND'S "ENGLISH BIRD NOTES" IN VOL. 58, P. 68, 1944.— As one born and brought up in England, and a former student and worker in the Ornithological Department of the British Museum, I was particularly interested in Dr. A. L. Rand's comments and quotations under the title of "English Bird Notes" in the recently issued March-April number of *The Canadian Field-Naturalist*, 58, p. 68. The idea of helping ornithologically inclined Canadian boys to understand English bird-life is an excellent one, and judging by the quoted letter, Mr. Kinnear's efforts along these lines have been much appreciated. Such an arrangement should work both ways, and certainly every effort should be made by members of our Club to contact nature loving British boys who are now training in Canada, and give them any assistance possible in their endeavours to learn something

about Canadian Zoology, and Botany. However, this was not the main object of my note which was rather to comment on certain passages in LAC Miller's letter to Mr. Mack of Guelph. Far be it from me to criticize anything in a letter from an enthusiastic airman to his friend, but for the sake of mutual understanding by ornithologists on both sides of the Atlantic who may happen to read Dr. Rand's quotations, it hardly seems right to let certain obvious misapprehensions, as evidenced in the letter, go without comment. The observations of English bird-life were, according to the quotations, made between January 14 and January 19. On the first date the letter mentions seeing "woodlarks (quite similar to our horned larks) which are very rare and localized". Rare and localized they are, but woodlarks do not in the least resemble horned larks. They are in appearance quite typical of the skylark group, in fact a small skylark with a particularly short tail would in brief describe it. The shore lark of England is the only horned lark, and the only lark occurring there that could be said to resemble our horned larks, which it does very closely. In Epping Forest, a few days later, the correspondent mentions seeing among other interesting birds, and in the following words:- "great titmice (these are very comical creatures with long unwieldy tails)." Here is surely a misunderstanding for the great titmouse is a typical chickadee of the genus *Parus*, albeit a somewhat large and brilliantly coloured one. It seems probable that our enthusiastic young bird-man got his names badly mixed and instead of meaning the great titmouse, the largest of the British chickadees, he really meant to write of the smallest species, the very charming little long-tailed titmouse *Acredula rosea*[1]; although I may say that it never occurred to me that such a dainty little-long-tailed ball of feathers could be accused of having an unwieldy tail, for my remembrance of the species is that in all its actions it is the very embodiment of grace. The only other comment I have to make, in connection with Dr. Rand's notes and quotations, is the mention of an observation of "1 common sandpiper" when out for a long walk near Lord Rothschild's Museum on January 18. Surely a very unusual date for the common sandpiper to be in England. This species, a close relative of our own spotted sandpiper, is like that species here, a summer bird, arriving as a general rule in late April or early May and departing for its winter home in Africa usually not later than September[2].

— R. W. SHEPPARD, NIAGARA FALLS, ONTARIO.

1.—**Aegithalos caudatus** of 1940 Handbook of British Birds.

2.—The similarity of newly-seen foreign birds to familiar birds of ones homeland is the first thing that strikes a wandering ornithologist. To LAC Miller the woodlark evidently recalled a horned lark. The great Titmice evidently appeared as comical creatures, with long unwieldy tails.

As to the common sandpiper in England, Witherby, et. al. (1940 The Handbook of British Birds, Vol. 4, p. 299) write: Single birds fairly often recorded in winter in various parts of England.

—A. L. Rand.

DISTRIBUTION OF THE CYPRINID FISHES, *N. deliciosus* AND *N. volucellus* IN ONTARIO. — Hubbs and Greene, (1928) have shown that many of the cyprinids recorded under the name *Notropis blennius* actually belong to the species *Notropis deliciosus* or *N. volucellus* and that the latter two species have been commonly confused.

Re-examination of the specimens recorded as *deliciosus* from Lake Nipigon (Dymond 1927) shows them to be *volucellus*.

N. delicosus so far as our present knowledge is concerned does not occur in Ontario north of the north shore of Lake Huron, Lake Nipissing and the Ottawa River.

N. volucellus is known in Ontario from the Rainy River area (Hubbs letter), Lake Nipigon (see above), Lake Attawapiskat (Lat. 52° 10′) and Favourable Lake area (Lat. 52° 50′) (Dymond and Scott 1941).

N. blennius is not known from Ontario but occurs in the Prairie Provinces.

References

Dymond, J. R. 1927. The fishes of Lake Nipigon. Univ. Tor. Studies, Biol. Ser. Pub. Ont. Fish Res. Lab. 27.

Dymond, J. R and W. B. Scott 1941. Fishes of Patricia portion of the Kenora District, Ontario. *Copeia* 1941. No. 4. pp.244.

Hubbs, C. L. and C. W. Greene 1928. Further notes on the fishes of the Great Lakes and tributary waters. *Mich. Acad. Sci., Arts and Letters* 8: 375-379.

— J. R. DYMOND, ROYAL ONTARIO MUSEUM OF ZOOLOGY, TORONTO.

BOOK REVIEWS

SOIL EROSION AND LAND USE SURVEY, HOPE TOWNSHIP PROJECT AREA, DURHAM COUNTY, ONT. *By N. R. Richards and F. F. Morwick, 1943. Co-operative Soil Survey Project by the Experimental Farms Service, Dominion Department of Agriculture in Co-operation with the Ontario Agricultural College, Guelph, Ontario.*

Another forward step in the conservation and intelligent utilization of our natural resources, this twenty-eight page mimeographed report is particularly well organized and is written for the layman as well as the scientist.

The authors begin with a statement of their problem and go on to describe the 22,080 acre area from such points of view as physiography, drainage, vegetation, climate, and transportation facilities.

The second part deals with agriculture, past and present. The development of farming in the region is sketched and the crops that are grown are considered. Then they go on to the main body of the survey — Soil Erosion and Land Use Survey. This is broken up into five sections which are dealt with scientifically and directly. After describing the methods and definitions used in the work, soils, slope, present land use and erosion are considered in order. Each of these topics is broken down into details and analyzed in relation to each other. Consideration is given to the present uses in four classes, cropland, pasture land, woodland and idle land. Fourteen soil types are recognized and discussed. The seriousness of erosion in the area is emphasized and its progress where aided by overgrazing, and loss of cover is brought out forcefully to show what is actually occurring in this one small region alone.

The significance and use of this survey is typical of what can and should be done in many regions. Five land classes are recognized in the project area in relation to their suitability for cultivation and to what extent they can be expected to yield if intelligently farmed and what cultural practices will be necessary in each case. Each of the four classes is considered in detail and one can not help but feel that here is a project of a type fundamental to future land use policy.

This report is recommended for its interest and careful detailed analyses, as well as for its direct attack upon a vital problem. A large four inch to the mile map, sixteen tables, three figures, and eight photographs of the region add to the interest and value of an excellent paper. — M. N. ZINCK.

HANDBOOK OF FROGS AND TOADS. *By Anna Allen Wright and Albert Hazen Wright; Comstock Publishing Company, Ithaca, New York, 1942; pp. 286, illustrated, $3.00.*

This book, a second edition of the 1933 handbook enlarged from 231 to 286 pages, is designed for students, teachers and naturalists. It contains descriptions of the 98 species and sub-species of frogs and toads of Canada and the United States. Each account of a species occupies two pages and, with a few exceptions, is accompanied by a panel of pictures. The discussion of a species covers names, common and scientific; range; habitat; size; general appearance; structure; voice; breeding, treatment of the development from the egg stage through the transformation of the tadpole; and notes, of two sorts - excerpts from the authors' field journals, giving the reader a feeling of some of the joys and puzzles of the search, and quotations from fifty contributors to the study of this subject.

There are 88 plates composed of 440 photographs and 30 drawings of living frogs and toads representing each species in several different postures.

The illustrated introduction gives general biological information and a key to the use of the book. The bibliography lists publications, check lists and province and state references. —C. L. PATCH.

INDEX TO VOLUME 58

—A—

Abies balsamea ... 4, 5
lasiocarpa ... 182
Acanthis hornemanni ... 103
hornemanni exilipes ... 172
linaria ... 103
holboelli ... 173
linaria ... 173
rostrata ... 173
Accipiter cooperi ... 150
gentilis atricapillus ... 114
striatus velox ... 115
velox ... 40
velox ... 150
Acer circinatum ... 63
macrophyllum ... 63
Acervularia ... 28
davidsoni ... 28, 29
Achillea borealis ... 131
Acredula rosea ... 195
Actitis macularia ... 41, 117, 154
Additional grasses for Ottawa list, by W. G. Dore and H. Groh ... 193
Aerides crispa ... 76
Ageliaus phoeniceus phoeniceus ... 171
Agropyron cristatum ... 193
Agrostis scabra ... 4
Aix sponsa ... 148
Alaska highway in British Columbia, Birds of the, by A. L. Rand ... 111
Alces americana ... 50, 100
Alder ... 39, 188
Alewife ... 31
Allin, A. E.
Nesting of the barred owl (*Strix varia*) in Ontario ... 8
The turkey vulture in Ontario, north and west of Lake Superior ... 185
Alnus incana ... 4, 5
Alopex lagopus ... 99
Amanita ... 30
Amelanchier Bartramiana ... 5
Amendments to By-laws, Ottawa Field-Naturalists' Club ... 51
Amesia ... 75
latifolia ... 75
Ammodramus savannarum ... 84
savannarum australis ... 174
Ammospiza caudacuta nelsoni ... 174
Analysis of mink predation upon muskrats in north central United States, An, review by A. L. Rand ... 18
Anaphalis margaritacea var. *occidentalis* 131
Anas platyrhynchos ... 40
platyrhynchos platyrhynchos ... 114, 118
rubripes ... 148
Anderson, R. M. and A. L. Rand
The long-tailed meadow mouse (*Microtus longicaudus*) in Canada ... 19
Anemone narcissiflora var. *villosissima* ... 131
occidentalis ... 38
Antennaria ... 30
Anthoxanthum odoratum ... 193
Anthus spinoletta rubescens ... 122, 166
Antrostomus vociferus vociferus ... 159
Aquila chrysaëtos ... 40
chrysaëtos canadensis ... 115, 151
Arbutus Menziesii ... 51
Archilochus colubris ... 159
Ardea herodias herodias ... 145
Arenaria interpres morinella ... 23, 154
melanocephala ... 117
Arnica unalaschkensis ... 131
Arquatella maritima ... 155
Artemisia Richardsoniana ... 131
Arvicola mordax ... 20
Asclepias ... 177, 178
cornuta ... 179
incarnata ... 177, 178, 179, 180
speciosa ... 178
Sullivantii ... 10, 11
syriaca ... 10, 11, 22, 177, 179, 180
Asio flammeus flammeus ... 159
wilsonianus ... 159
Aspen ... 38, 39
Aster foliaceus ... 5
Astragalus ... 30
Astur atricapillus ... 40
atricapillus atricapillus ... 150
Atrypa reticularis ... 28
spinosa ... 28
Automeris io ... 191

—B—

Bacterium tularensis ... 55
Badger ... 47, 78, 85
Baked-apple ... 4
Balaena mysticetus ... 102
Baldpate ... 114, 137, 141, 148
Bartramia longicauda ... 83, 117, 154
Basilarchia arthemis ... 23
astyanax-arthemis ... 23
Basilarchia astyanax-arthemis Comstock in the Toronto region, by Charles E. Corfe ... 23
Basswood ... 188
Bat, Little Long-eared ... 46
Bear ... 87
Barren Ground ... 98
Black ... 39, 46, 78, 86, 88, 98
Grizzly ... 47
Beaver ... 37, 38. 48. 57, 78, 85, 87, 88, 99
American ... 89
Bed Straw ... 189
Betula occidentalis ... 63
papyrifera ... 5
Bighorn, Rocky Mountain ... 50
Biotic provinces of North America, The, review by A. L. Rand ... 105
Birch, Western ... 63
Birds of Ottawa, 1944, The, by Hoyes Lloyd ... 143
Birds of the Alaska highway in British Columbia, by A. L. Rand ... 111
Bison, Folsom ... 69
Bittern, American ... 146
Eastern Least ... 146

Blackbird, Brewer's 140, 141
Red-winged 136, 139
Rusty 124, 171
Black-crowned night heron nesting in Lincoln County, Ontario, by R. W. Sheppard 31
Bladder campion 189
Blarina brevicauda 104
Bluebird, Eastern 165
Mountain 37, 39, 40, 44, 122
Bobcat 94
Barred 48
Bobolink 152, 170
Bob-white 139
Bombycilla cedrorum 166
garrula 44
pallidiceps 122, 166
Bonasa umbellus 41, 102, 194
umbellus togata 152
umbelloides 116
yukonensis 116
Botanical field notes — summer of 1943, by W. Sherwood Fox 10
Botaurus lentiginosus 146
Brant, American 147
Black 140
Branta bernicla hrota 147
canadensis 40, 112
canadensis 114, 147
leucopareia 114
leucopsis 102
Braya 30
Breeding, distribution, history and population of the North Atlantic Gannet, (*Sula bassana*). Part I -A history of the gannet's colonies, and the census in 1939, The, review by A.L. Rand 175
Brodie Club, The, proceedings, review by Harold A. Senn 134
Bromus Dudleyi 193
Kalmii 193
Brown, John H.
The susceptibility of fur-bearing animals and game birds to tularaemia 55
Bubo virginianus 41
virginianus heterocnemis 158
lagophonus 118
lagophonus 119
saturatus 118
subarcticus 118
subarcticus x *saturatus* 118
virginianus 158
Buffalo berry 38
Buffle-head 83, 114, 137, 139, 140, 141, 149
Bunting, Common Snow 135
Eastern Snow 175
Indigo 172
Snow 103, 135, 136, 137, 139, 140
Buteo borealis 40
borealis borealis 150
jamaicensis 115
"calurus" 115
harlani 115
lagopus 102
s.-johannis 115, 151
lineatus lineatus 150
platypterus platypterus 151
swainsoni 151
Butorides virescens virescens 146
Butterfly, Archippus 180
Buttonwood 11
Buzzard, Turkey 185

—C—

Calamagarostis 30
Langsdorffii 4, 5
nutkaensis 130
Calcarius lapponicus alascensis 125
lapponicus lapponicus 175
Calidris canutus rufus 155
Calla palustris 17, 18
Calotropis gigantea 178
Calypso borealis 38
Campanula lasiocarpa 131
Camponotus 41
Canachites canadensis canace 152
canadensis canadensis 116
osgoodi 116
franklini 40
Canis latrans 47, 82
lupus 47, 99
Canvas-back 138, 140, 141, 149
Capella delicata 117, 154
Cardinal 84, 137, 138, 139
Eastern 171
Carex 29, 30, 33, 37
aquatilis 4
circinata 130
disperma 4
exilis 4
limosa 4
macrochaeta 130
Mertensii 38
nigricans 38
pauciflora 4
trisperma 4, 5
Caribou, Barren Ground 100
Woodland 100
Carpodacus cassini 45
purpureus purpureus 172
Casmerodius albus egretta 146
Castanea chrysophylla 65
Castanopsis chrysophylla 65
Castor canadensis 48, 89, 99
Catabrosa aquatica 4
Catasetum eburneum 76
Catbird 164, 189
Cathartes aura 83
aura septentrionalis 185
Catoptrophorus semipalmatus inornatus 155
Cattleya Forbesii 76
intermedia 76
Loddigesii 76
marginata 75, 76
pumila 76
Ceanothus 38
Celtis occidentalis 11
Ceophloeus pileatus 41, 119
pileatus abieticola 160
Certhia familiaris americana 164
Cervus 65
canadensis 50, 82
Chaetura pelagica 69, 159
Chamaedaphne calyculata 4, 5
Charadrius semipalmatus 153
Charionetta albeola 83, 114, 149
Chat, Yellow-breasted 24

Chaulelasmus streperus 148
Chen caerulescens 83, 147
hyperborea 40
hyperborea 147
Cherry, Choke 38
Wild 63
Chickadee, Acadian 135
Black-capped 43, 121, 135, 136, 137, 138, 139, 140
Brown-headed 140
Chestnut-backed 141
Columbian Brown-headed 121
Eastern 163
Hudsonian 36, 38, 43, 140, 163
Long-tailed 140
Mountain 38, 43
Oregon 140
Chicken, Prairie 58
Chimney swifts gathering twigs, by M.G. Street 24
Chinquapin 65
Chiogenes hispidula 5
Chipmunk 36, 39, 48
Least 36, 46
Chlidonias nigra surinamensis 157
Chordeiles minor 41
minor minor 119, 159
Christmas Bird Census, 1943 135
Chrysanthemum arcticum 131
segetum 131
Chrysops 56
noctifer 56
Cinclus mexicanus 43
mexicanus unicolor 121
Cinna latifolia 5
Circus cyaneus hudsonius 115
hudsonius 151
Cistothorus stellaris 83, 164
Citellus columbiana 48
lateralis 48
richardsonii 186
Cladonia rangiferina 4
sylvatica 4
Cladopora 28
Clangula hyemalis 149
Clarke, C. H. D.
A positive pyrotropism 142
An extreme case of so-called "injury-feigning" by a female ruffed grouse (*Bonasus umbellus*) 194
Gleanings from the natural history of Huron County, Ontario 82
Notes on the status and distribution of certain mammals and birds in the Mackenzie river and western arctic area in 1942 and 1943 97
Clarke's nutcracker, *Nucifraga columbiana*, at Banff, by N. B. Sanson 182
Claytonia sarmentosa 130
sibirica 130
Clethrionomys gapperi 46, 49
gapperi gapperi 9
Coccyzus americanus americanus 158
erythropthalmus 158
Coelogyne cristata 76
Coelopleurum Gmelini 131
Colaptes auratus 183
auratus auratus 183, 184
cl.*auratus-luteus* 183, 184
borealis 183, 184
luteus 119, 160, 183, 184
caffer 41, 183
Columba 65
fasciata 64
livia livia 157
Colymbus auritus 145
grisegena holboelli 112, 145
Common edible mushrooms, review by J. W. Groves 30
Compsothlypis americana pusilla 168
Comptonia 134
elegans 134
stelcki n. sp. 132, 133
wintoni 134
Contributions to the flora and phytogeography of south-western Greenland: an enumeration of the vascular plants, with critical notes, review by Harold A. Senn 33
Coot, American 137, 139, 140, 141, 153
Coprinus atramentarius 30
micaceus 30
Coptis groenlandica 5
trifolia 131
Corallorhiza odontorhiza 191
Coral Root, Autumn 191
Corfe, Charles E.
Basilarchia astyanax-arthemis Comstock in the Toronto region 23
Two moths from one cocoon 191
Cormorant 135
Eastern Double-crested 145
Pelagic 141
Cornus canadensis 5
Nuttalli 63
stolonifera 5
Corthylio calendula 44
calendula calendula 165
Corvus brachyrhnchos 43
brachyrhynchos brachyrhynchos 163
corax 43
principalis 121, 163
Coturnicops noveboracensis 153
Cougar 47
Cowan, I. McTaggart
see Munro, J. A. and I. McTaggart Cowan
Cowbird 40, 45, 139, 188
Eastern 171
Coyote 47, 78, 82
Coypu 22
Coypu at Crescent, B.C., by M. W. Holdom 22
Craigie, J. H.
William Pollock Fraser, 1867-1943 1
Crane, Little Brown 117
Sand-hill 102
Whooping 142
Creeper, Brown 135, 136, 137, 138, 139
Eastern Brown 164
Crocethia alba 156
Crossbill, Red 45, 73
White-winged 124, 173
Crow, American 43, 136, 137, 138, 139, 140
Eastern 135, 163
Northwestern 140, 141
Western 141

Cryptoglaux acadica acadica 159
funerea richardsoni 119, 159
Cuckoo, Black-billed 158
Eastern Yellow-billed 158
Cucujus clavipes 42
Curlew, Hudsonian 102, 154
Cyanocitta cristata cristata 163
stelleri 43
Cyathophyllum 28
Cygnus buccinator 102
columbianus 147
Cynosurus cristatus 193
Cyperus Schweinitzii 17
strigosus 17
Cyprinid fishes *N. deliciosus* and *N. volucellus* in Ontario, distribution of the By J. R. Dymond 195
Cypripedium acaule 74
barbatum 76
Calceolus var. *pubescens* 38, 73
caudatum 76
insigne 75
Pitcherianum 75
spectabile 76
Spicerianum 76
superbiens 75
Warszewickii 76
Cyrtina hamiltonensis 28
Cystiphyllum 28
Cystophora cristata 99

—D—

Dafila acuta tzitzihoa 114, 148
Dale, Edgar Melville Serle - 1883-1943 by John Dearness 127
Danais Archippus 180
Dearness, John
Edgar Melville Serle Dale - 1883-1943 127
Deer 35, 37, 39
Mule 38, 50, 100
White-tailed 38, 50, 82
Delphinapterus leucas 102
Dendragapus obscurus 40
obscurus richardsoni 116
Dendrobium Wardianum 76
Dentroctonus 42
monticola 42
Dendroica aestiva aestiva 168
amnicola 123
auduboni 44
caerulescens caerulescens 168
castanea 123, 169
cerulea 169
coronata 123, 168
fusca 169
magnolia 123, 168
palmarum 181
hypochrysea 169, 181, 182
palmarum 123, 181, 182
pensylvanica 169
pinus pinus 169
striata 123, 169
tigrina 168
townsendi 44
virens virens 169
Dermacentor andersoni 56, 59
variablis 56, 186
Deschampsia caespitosa ssp. *orientalis* 130
flexuosa 193
Devitt, O. E.
An Ontario nest of the Evening Grosbeak 190
Dickcissel 172
Dicranodonta dowlingi 132
Dipper 40, 43
American 121
Does *Sphaerium occidentale* mature in one season? by H. B. Herrington 6
Dogwood 38, 63
Dolichonyx oryzivorous 170
Dore W. G. and H. Groh
Additional grasses for Ottawa list 193
Dove, Mourning 64, 138, 139
Eastern Mourning 157
Rock 136, 139, 140, 157
Dowitcher, Eastern 156
Drosera rotundifolia 5
Dryobates pubescens medianus 160
pubescens nelsoni 119
villosus 41
septentrionalis 119
villosus 160
Dryopteris Linnaeana 4
spinulosa 4, 5
Duck 58
Black 135, 136, 137, 138, 148
Greater Scaup 137, 139, 140, 141, 149
Harlequin 40, 139, 140
Lesser Scaup 139, 149
Mallard 137, 138, 140, 141
Old Squaw 96
Ring-necked 149
Ruddy 150
Scaup 139
Western Harlequin 114
Wood 148
Dumetella carolinensis 164
Dymond, J. R.
Distribution of cyprinid fishes *N. deliciosus* and *N. volucellus* in Ontario 195
Spread of the smelt (*Osmerus mordax*) in the Canadian waters of the Great Lakes 12

—E—

Eagle, American Golden 115
Bald 138, 139, 141
Golden 36, 40, 151
Northern Bald 115, 151
Early Hooker plant ranges restored, by Herbert Groh 17
Early studies of milkweed utilization in Canada by Harold A. Senn 177
Ectopistes migratorius 157
Egret, American 146
Eider, King 149
Northern 135
Elanoides forficatus forficatus 150
Elk 82
Elm 188
Elodea canadensis 126
Elymus arenarius ssp. *mollis* 130
Empetrum nigrum 131
Empidonax flaviventris 120, 161
hammondi 42
minimus 120, 161

trailli 42
trailli 120, 161
wrighti 42
English bird notes, by A. L. Rand 68
Enstone, J. A.
Spring Field Excursion, Ottawa Field-Naturalists' Club 188
Epidendrum cochleatum 74
cochleatum var. *triandrum* 74
Epilobium angustifolium 5
Behringianum 131
Bongardi 131
glandulosum 131
var. *adenocaulon* 5
Epipactis latifolia 75
Epipactis, Broad-leaved 75
Equisetum 39, 44
arvense 4, 5
sulvaticum 4
Erethizon dorsatum 82, 100
epixanthum 49
Ereunetes pusillus 118, 156
Eriophorum callitrix 38
russeolum 130
spissum 4
virginicum 4
Erismatura jamaicensis rubida 150
Erolia bairdi 118
minutila 118
Errington, Paul L.
To babes really lost in the woods 52
Euarctos americanus 46
Euphagus carolinus 124, 171
Eutamias amoenus 46, 48
Experimental modification and control of moult and changes of coat color in weasels by controlled lighting, review by A. L. Rand 184
Extension of range of Puget Sound spotted skunk (*Spilogale phenax olympica*), by Kenneth Racey 104
Extension of range of the northern spotted owl (*Strix occidentalis caurina*), by Kenneth Racey 104

—F—

Falco columbarius bendiri 116
columbarius columbarius 115, 116, 151
suckleyi 116
islandus 144
peregrinus 102
rusticolus 144
candicans 151
gyrfalco 151
obsoletus 151
sparverius 40
sparverius 116, 152
Falcon, Peregrine 102
Farley, Frank L.
Saskatchewan records of the whooping crane (*Grus americana*) 142
The screech owl in central Alberta 142
Favosites 28
alpenensis 28
limitaris 28
Felis concolor 47
Festuca capillata 193
elatior var. *arundinacea* 193
Finch, Cassin 38
Cassin Purple 45
Common Purple 137, 138, 139
Eastern Purple 137, 172
Grey-crowned rosy 36
Purple 140, 141
Fir, Balsam 182
Douglas 63
Fisher 47, 77, 78, 79, 80, 87, 98
Fishes, cyprinid 195
Flicker 183
Northern 135, 160
Northern Yellow-shafted 119
Northwestern Red-shafted 140, 141
Red-shafted 37, 38, 39, 40, 41, 183
Yellow-shafted 136, 137, 138, 139
Flycatcher, Alder 40, 42, 120, 161
Hammond 38, 42
Least 120, 161
Northern Crested 161
Olive-sided 35, 38, 42, 120, 161
Wright 37, 40, 42
Yellow-bellied 120, 161
Fomes 4
Fox 88
Arctic 97, 99
Blue 78
Coloured 99
Cross 85
Red 47, 86, 92
Silver 78, 85
Fox, W. Sherwood
Botanical field-notes - summer of 1943 10
Fraser, William Pollock, 1876-1943 1
Frog, Swamp Cricket 68
Fruits of the earth, review by H. A. Senn 125
Fulica americana americana 153
Fur Bearers 85

—G—

Gadwall 148
Galium labradoricum 5
Gallinula chloropus cachinnans 153
Gallinule, Florida 153
Gannet 145
North Atlantic 175
Garry oak in British Columbia, The, by R. Glendenning 61
Gaspereau 31
Gastroplites 132, 133
kingi 132
Gavia adamsi 102
arctica pacifica 112
immer 40, 102
immer 112, 145
stellata 145
Gentiana 30
Geomys 71, 72
bursarius 71
Geothlypis trichas 44
trichas brachidactyla 170
occidentalis 123
Geranium erianthum 131
Geum calthifolium 131
pentapetalum 131
Glaucionetta clangula americana 149
islandica 40
Glaucomys sabrinus 48

Gleanings from the natural history of Huron County, Ontario, by C. H. D. Clarke 82
Glendenning, R.
The garry oak in British Columbia 61
Glycerina canadensis var. *laxa* 193
Goat 46
Mountain 51
Godwit, Hudsonian 156
Marbled 156
Golden-eye 135, 139
American 136, 137, 138, 139, 140, 141, 149
Barrow 40, 141
Common 138
Goldfinch, American 136, 137, 138, 139
Eastern 135, 136, 173
Goose, Barnacle 102
Blue 83, 147
Canada 40, 112
Common Canada 147
Lesser Snow 147
Snow 40, 84
Wild 23
Gopher, Dakota Pocket 71
Mississippi Valley Pocket 71
Goshawk 40
American 136, 137, 139, 140
Eastern 114, 150
Grackle, Bronzed 139, 171, 188
Grass, Cotton 38
Grebe, Holboell's 112, 139, 140, 141, 145
Horned 140, 141, 145
Pied-billed 145
Western 140, 141
Gresham, Albert Burton, 1905-1941, by J. Dewey Soper 176
Groh, Herbert
Early Hooker plant ranges restored 17
Milkweed Extremes 22
Potamogeton crispus L. in Alberta 126
See also Dore W. G. and H. Groh
Grosbeak, Canadian Pine 135, 172
Eastern Evening 135, 172, 190
Evening 38, 45, 136, 137, 139, 140, 190
Pine 124, 135, 136, 137, 139, 140
Rose-breasted 172, 188
Grouse, Blue 38, 40
Canada Ruffed 152
Canada Spruce 116, 152
Franklin 35, 40
Northwestern Sharp-tailed 116
Nova Scotia Ruffed 135
Richardson's Dusky 116
Ruffed 41, 102, 135, 136, 137, 139, 140, 194
Sharp-tailed 83, 102, 140
Yukon Ruffed 116
Groves, J. W.
Review of Common edible mushrooms 30
Grus americana 142
canadensis 102
canadensis 117
Guide to bird watching, A, review by A. L. Rand 129
Gull, Bonaparte's 83, 118, 139, 157
Glaucous 136, 137, 156
Glaucous-winged 140, 141
Great Black-backed 135, 136, 137, 139, 156
Herring 102, 118, 135, 136, 137, 138, 139, 140, 141, 157, 189
Iceland 68, 83, 137
Ring-billed 137, 138, 139, 157
Sabine's 157
Short-billed 118, 140, 141
Thayer's 138, 140
Gulo luscus 47, 99
Güssow, H. T.
Review of Northern fishes with special reference to the upper Mississippi Valley 27
Gymnadenia conopsea 75
Gyrfalcon, Black 151
White 151

—H—

Habenaria 74
ciliaris 74
fimbriata 74
hyperborea 130
psycodes 74
Hackberry 11, 189
Haemaphysalis cinnabarina 56
leporis-palustris 56, 59
Haliaeetus leucocephalus alascanus 151
washingtoniensis 115
Handbook of frogs and toads, review by C. L. Patch 196
Hare, Arctic 100
European 82
Varying 82
Hawk, American Marsh 115
American Rough-legged 115, 137, 138, 139, 151
American Sparrow 116, 137, 139
Broad-winged 151
Cooper's 96, 137, 138, 139, 150
Eastern Pigeon 115, 151
Eastern Red-tailed 150
Eastern Sharp-shinned 150
Eastern Sparrow 152
Harlan's Red-tailed 115
Marsh 137, 138, 139, 151
Northern Red-shouldered 150
Red-shouldered 139
Red-tailed 39, 40, 137, 138, 139
Rough-legged 102
Sharp-shinned 40, 115, 137, 139
Sparrow 40
Swainson's 144, 151
Hedymeles ludovicianus 172
Helmitheros vermivorus 192
Hen-harrier 115
Hennessy, T. S.
Unique marker found on Wild goose 23
Herodias egretta 146
Heron, Black-crowned night 31, 83, 137, 138, 146
Eastern Great Blue 145
Eastern Green 146
Great Blue 137, 138
Northwest Coast 140, 141
Herring, Branch 31
Herrington, H. B.
Does *Sphaerium occidentale* mature in one season? 6
Hesperiphona vespertina 45
vespertina vespertina 172, 190

Hieracium triste 131
Hirundo erythrogaster 162
Histrionicus histrionicus 40
histrionicus pacificus 114
Holdom, M. W.
Coypu at Crescent B.C. 22
Honckenya peploides ssp. *major* 130
Hordeum vulgare 193
Horntail 142
Hummingbird 69
Ruby-throated 159
Rufous 41
Huron County 82
Hydroprogne caspia imperator 157
Hylocichla fuscescens fuscescens 165
guttata 43, 122
faxoni 122, 165
guttata 122
minima aliciae 165
mustelina 165
ustulata 43
swainsoni 122, 165
Hypothyridina castanea 28
cuboides 28
emmonsi 28
venustula 28

—I—

Icteria virens 24
Icterus galbula 171
Inoceramus caddotensis 133
caddotensis var. *altifluminus* 132
Ips 41
Iridoprocne bicolor 42, 120, 162
Iris setosa 130
Ixobrychus exilis exilis 146
Ixodes 56
Ixoreus naevius 43
naevius meruloides 121

—J—

Jaeger, Parasitic 156, 192
Jay, Blue 135, 136, 137, 138, 139, 140
Canada 35, 38, 43, 120, 135, 136, 140
Eastern Canada 163
Grey 104
Northern Blue 163
Stellar 43
Junco hyemalis hyemalis 124, 174
oreganus 45
Junco 152
Eastern 124
Northern Slate-colored 174
Oregon 38, 39, 45, 137, 139, 140, 141
Slate-colored 135, 136, 137, 138, 139, 141, 181
Juncus albescens 5
ensifolius 130
mertensianus 130
Juniper 63
Juniperus communis 38
scopulorum 38, 63

—K—

Kalmia angustifolia 4, 5
polifolia 5
Killdeer 137, 141, 153
Kingbird, Eastern 119, 161
Kingfisher, Belted 37, 41, 83, 119, 137, 138, 139, 140
Eastern Belted 160
Western Belted 141
Kinglet, Eastern Golden-crowned 122, 135, 165
Eastern Ruby-crowned 122, 165
Golden-crowned 35, 44, 136, 137, 138, 139, 140
Ruby-crowned 38, 44
Sitka 141
Western Golden-crowned 141
Kite, Swallow-tailed 150
Knot, American 155
Kobresia 30

—L—

Lady's Slipper 75, 76
Large Yellow 73
Pink 74
Lady's Thumb 189
Laelia purpurea 76
Lagopus lagopus 116
leucurus 41
mutus rupestris 116
Landon, Monroe
Rediscovery of *Corallorhiza odontorhiza* 191
Lanus borealis 122
borealis borealis 166
ludovicianus migrans 166
Larix laricina 4
Lark, Horned 137, 138, 195
Hoyt's Horned 162
Northern Horned 162
Pallid Horned 120
Prairie Horned 162
Shore 195
Larus argentatus 102
argentatus smithsonianus 118, 157
canus brachyrhynchos 118
delawarensis 157
hyperboreus 156
leucopterus 83
marinus 156
philadelphia 83, 118, 157
Laurence Bedford Potter, 1883-1943, by J. Dewey Soper 66
Ledum groenlandicum 4, 5, 38
Lemming 97
Leptarrhena pyrolifolia 131
Lepus americanus 50, 82
arcticus 100
europaeus 82
Lewis, Harrison F.
Recent breeding of the rough-winged swallow near Ottawa 15
Ruddy turnstone at Ottawa in 1943 23
Liatris spicata 11
Limnodromus griseus griseus 156
Limosa fedoa 156
haemastica 156
Linnaea borealis 131
borealis var. *americana* 5
Linnet, Redpolled 103, 136, 138
List of the birds of Nipawin, Saskatchewan, A, review by A. L. Rand 96
Lloyd, Hoyes
Review of Some aspects of Canadian birds 18

Review of Some familiar Canadian birds...69
The Birds of Ottawa, 1944 ... 143
Lobipes lobatus ... 118, 156
Loiseleuria procumbens ... 131
Lomatogonium ... 33
Longspur, Alaska Lapland ... 125
Lapland ... 139, 175
Long-tailed meadow mouse (*Microtus longicaudus*) in Canada, The, by R. M. Anderson and A L. Rand ... 19
Lonicera ... 35
Loon ... 38, 40
Common ... 102, 137, 139, 140, 145
Greater Common ... 112
Lesser ... 141
Pacific ... 112
Red-throated ... 135, 141, 145
Yellow-billed ... 102
Lophidiaster ornatus ... 133
silentiensis n. sp. ... 132, 133
Lophodytes cucullatus ... 150
Loxia curvirostra ... 45
curvirostra pusilla ... 173
leucoptera ... 124, 173
Lupinus nootkatensis ... 131
Lutra canadensis ... 47, 91
Luzula parviflora ... 4
Wahlenbergii ... 130
Lycopodium annotinum ... 4
obscurum ... 4
sabinaefolium var. *sitchense* ... 130
Selago ... 130
Lynx canadensis ... 48, 92, 99
fasciatus ... 48
gigas ... 94
Lynx ... 78, 86, 88, 93, 94, 99
Canada ... 48, 92

—M—

Madrono ... 63
Magpie ... 43, 140
American ... 140
Mallard ... 38, 40, 81, 136
Common ... 114, 148
Mallard in British Columbia, review by A. L. Rand ... 81
Maple, Broad Leaved ... 63
Vine ... 63
Marchantia polymorpha ... 4
Mareca americana ... 114, 148
penelope ... 148
Marmot, Hoary ... 36, 48
Marmota caligata ... 48
Marten ...
36, 37, 38, 46, 47, 77, 78, 79, 85, 87, 88, 98
American ... 90
Martes americana ... 47, 90, 98
pennanti ... 47, 77, 98
Martin, Eastern Purple ... 163
Purple ... 189
Martinia meristoides ... 28
sublineata ... 28
Materials for a flora of the continental Northwest Territories of Canada, review by Harold A. Senn ... 30
McLearn, F. H.
The occurrence of starfish in the Lower Cretaceous of the Peace River Valley ... 132
Meadowlark ... 140
Eastern ... 139, 171
Western ... 44
Megaceryle alcyon ... 41, 83
alcyon alcyon ... 160
caurina ... 119
Melandrium ... 30
Melanerpes erythrocephalus ... 83, 160
Melanitta deglandi ... 149
perspicillata ... 102, 114, 149
Mellon Carnegie Museum expedition to the Mackenzie Delta, review by A. E. Porsild ... 84
Melospiza georgiana ... 175
lincolni ... 45
lincolni ... 175
melodia ... 84
melodia ... 175
Members of the Ottawa Field-Naturalists' Club and subscribers to the Canadian Field-Naturalist, May, 1944 ... 106
Menyanthes trifoliata ... 5
Menziesia ... 35
ferruginea ... 38
Mephitis mephitis ... 47, 92
Merganser, American Common ...
114, 135, 136, 137, 138, 139, 140, 141, 150
Common ... 138
Hooded ... 137, 138, 141, 150
Red-breasted 136, 137, 138, 139, 141, 150
Mergus merganser americanus ... 114, 150
serrator ... 150
Microsorex hoyi ... 46
Microtus cautus ... 21
longicaudus ... 19
littoralis ... 21
macrurus ... 19
mordax ... 20
vellerosus ... 20, 21
macrurus ... 19, 20
mordax ... 19, 46, 49
littoralis ... 21
pennsylvanicus ... 46, 49
townsendi ... 19
laingi ... 19
tetramerus ... 19
townsendi ... 19
vellerosus ... 20, 21
Milkweed ... 10, 177
Common ... 22, 177, 179
Swamp ... 179
Milkweed Extremes, by H. Groh ... 22
Mimulus guttatus ... 131
Mink ... 18, 37, 38, 47, 58, 77, 85, 86, 88, 90, 98
Mississippi Valley pocket gopher (*Geomys bursarius* Shaw) in Manitoba, The, by J. Dewey Soper ... 71
Mniotilta varia ... 167
Molothrus ater ... 45
ater ater ... 171
Moneses uniflora ... 5
Moose ... 38, 39, 46, 50, 100
Moris bassana ... 145
Motion, Notice of, by Pauline Snure ... 141
Mousley, Henry
Peloria and other abnormalities in orchids ... 73
Mouse, Jumping ... 36, 37, 38

Long-tailed Meadow 19
Red-backed 36, 38
Rocky Mountain Jumping 49
White-footed 36, 38, 49
Muckweed, Curly 126
Mudar 178
Muhlenbergia uniflora 193
Munro, J. A. and I. McTaggart Cowan Preliminary report on the birds and mammals of Kootenay National Park, British Columbia 34
Murre, Brünnich's 157
Thick-billed 102
Mushroom 30
Musk-ox 101
Muskrat 18, 49, 58, 86, 87, 88, 95, 99
Mustela cicognanii 47, 91, 184
frenata 47, 184
vison 47, 90, 98
Mute swan in Ontario, The, by L. L. Snyder 193
Myadestes townsendi 44, 122
Myiarchus crinitus boreus 161
Myiochanes richardsoni 42
richardsoni richardsoni 120
virens 161
Mynomes mordax 20
Myocastor coypus 22
Myotis 46
evotis 46

—N—

Name That Animal, review by D. B. O. Savile 70
Nannus hiemalis 43
hiemalis hiemalis 164
Natural History Society of Manitoba. 21st Anniversary Bulletin. 1920 to 1941. Review by Harold A. Senn 105
Neohaematopinus laeviusculus 56
Neotoma cinerea 49
Nephoecetes niger 41
Nesting of the Barred Owl (*Strix varia*) in Ontario, by A. E. Allin 8
Nettion carolinense 148
crecca carolinense 114
Newberria laevis 23
News of Naturalists 16, 129, 186, 187
Nighthawk 39, 41
Eastern 119, 159
Northern fishes with special reference to the upper Mississippi Valley, review by H. T. Gussow 27
Northern record of the flicker and a note on the cline *Colaptes auratus* cl. *auratus-luteus*, A, by A. L. Rand 183
Notes from a Labrador peat bog, by A. E. Porsild 4
Notes on the Cyperaceae of Saskatchewan. II *Carex*, review by Harold A. Senn ... 29
Notes on the large short-tailed shrew at Fort Garry, Manitoba, by J. Dewey Soper 104
Notes on the palm warbler, *Dendroica palmarum* (Gmelin), in Canada, by A. L. Rand 181
Notes on the status and distribution of certain mammals and birds in the Mackenzie River and western Arctic Area in 1942 and 1943, by C. H. D. Clarke ... 97
Notropis blennius 195
deliciosus 195
volucellus 195
Nova Scotia 85
Nucifraga columbiana 43, 182
Nutcracker, Clarke's 43, 182
Nuthatch, Red-breasted 38, 43, 121, 135, 136, 137, 138, 139, 141, 164
White-breasted 135, 136, 137, 138, 139, 164
Nuttallornis mesoleucus 42, 120, 161
Nyctea nyctea 83, 158
Nycticorax nycticorax 31, 83
nycticorax hoactli 146
Nyroca affinis 149
americana 149
collaris 149
marila 149
valisineria 149

—O—

Oak, Garry 61
Oceanodroma castro castro 145
Ochotona princeps 49
Occurrence of starfish in the Lower Cretaceous of the Peace River Valley, The, by F. H. McLearn 132
Occurrence of the chimney swift at Harrington County, Quebec, by Laura N. Thompson 69
Odobenus divergens 99
Odocoileus hemionus 50, 100
virginianus 50, 82
Odontoglossum citrosmum 76
grande 75
Oidemia americana 149
Old-squaw 135, 137, 139, 140, 149
Ondatra zibethica 49, 95, 99
Ontario nest of the evening grosbeak, An, by O. E. Devitt 190
Ophrys apifera 75, 76
apifera var. *friburgensis* 76
Arachnites 76
aranifera 76
Bertolonii 76
musifera 75
Myodes 76
Trollii 76
Oporornis philadelphia 170
tolmiei 44, 123
Orchid 73
Bee 75, 76
Wasp 76
Orchidaceae 75
Orchis mascula 75
morio 75
rotundifolia 38
Orchis, Butterfly 75
Oreamus americanus 51
Oriole, Baltimore 171
Ornithodorus 56
Osmerus mordax 12, 84, 128
Osprey, American 115, 151
Otocoris alpestris alpestris 162
alpestris arcticola 120
hoyti 162
praticola 162

Ottawa Field-Naturalists' Club, Amendments to By-laws 51
Sixty-fifth Annual Meeting 26
Spring Field Excursion, by J. A. Enstone 188
Statement of Financial Standing, December 2, 1943 25
Otter 38, 47, 78, 86, 88, 91
Otus asio 142
asio medius 158
Ovenbird 123, 170
Ovibus moshatus 101
Ovis canadensis 50
Owl, American Barn 158
American Hawk 140, 158
American Long-eared 138, 139
American Screech 137, 138, 139
Barred 8, 9, 112, 137, 138
Burrowing 96
Dusky Great-horned 118
Eastern Horned 158
Eastern Saw-whet 159
Eastern Screech 158
Great Gray 158
Great Horned 136, 137, 138, 139, 140
Horned 41, 54
Long-eared 159
Northern Barred 118, 158
Northern Spotted 104
Richardson's 119, 159
Screech 142
Short-eared 136, 159
Snowy 83, 97, 149, 158
Oxycoccus microcarpus 5
Oxyechus vociferus vociferus 153
Oxyria digyna 130
Oxytropis 30

—P—

Pandion haliaetus carolinensis 115, 151
Panicum linearifolium 193
Paphiopedilum caudatum 76
Sedeni 76
Warszewickii 76
Parnassia montanensis 38
Partridge, European 144, 152
European Gray 135, 137
Hungarian 140
Parus 195
Passer domesticus domesticus 124, 170
Passerculus sandwichensis 103
sandwichensis anthinus 124
nevadensis 124
savanna 173
Passerella iliaca 45
iliaca iliaca 125, 174
lincolni lincolni 125
Passerherbulus henslowi 84
Passerina cyanea 172
Pasteurella tularense 55
Patch C. L.
Review of Handbook of frogs and toads 196
Paxtonia rosea 76
Pedicularis contorta 38
Pedioecetes phasianellus 83, 102
phasianellus campestris 117
caurus 116
jamesi 117
Pelecanus erythrorhynchos 102, 145
Pelican, White 102, 145
Pelidna alpina sakhalina 156
Peloria and other abnormalities in orchids, by Henry Mousley 73
Penthestes atricapillus 43
atricapillus atricapillus 121, 163
gambeli 43
hudsonicus 43
columbianus 121
hudsonicus 163
Perdix perdix perdix 152
Perisoreus canadensis 43
canadensis albescens 121
canadensis 120, 163
pacificus 121
Perisoreus obscurus griseus 104
Peromyscus maniculatus 46, 49
Petasites 30
Petrel, Madeira 145
Petrochelidon albifrons 43
albifrons albifrons 120, 162
Pewee, Eastern Wood 161
Richardson's 120
Western Wood 38, 40, 42
Phaeopus hudsonicus 102, 154
Phalacrocorax auritus auritus 145
Phalaenopsis Stuartiana 76
Phalarope, Northern 118, 156
Red 156
Phalaropus fulicarius 156
Phasianus cochicus torquatus 152
Pheasant 58
Common 135, 136, 137, 140
Ring-necked 135, 136, 137, 138, 139, 141, 152
Phenacomys intermedius 46, 49
Phenacomys, Rocky Mountain 49
Philohela minor 154
Phoebe, Eastern 161
Say's 119
Phragmites communis 193
Phyllodoce aleution 131
Pica pica 43
Picea mariana 4, 5
Picoides arcticus 42, 119, 161
tridactylus 42
bacatus 161
fasciatus 119
Pigeon, Band-tailed 64
Passenger 157
Pika 36
Rocky Mountain 49
Pine, lodgepole 142
White-barked 182
Pinguicula vulgaris 38
Pinicola enucleator 124
enucleator leucura 172
Pinna curvimarginata 132
Pintail 137, 140
American 114, 148
Pinus albicollis 182
contorta 142
Pipilo erythrophthalmus erythrophthalmus 173
Pipit 36
American 122, 166
Piranga erythromelas 171
ludoviciana 45

Pisobia bairdi ... 155
fuscicollis ... 155
melanotos ... 155
minutilla ... 155
Plane tree ... 11
Platanthera chlorantha ... 75
Platanus occidentalis ... 11
Plectrophenax nivalis ... 103, 175
Plover, American Golden ... 153
Black-bellied ... 140, 153
Golden ... 102
Semipalmated ... 153
Upland ... 83, 117, 154
Pluvialis dominica ... 102
dominica dominica ... 153
Poa ... 30
Podilymbus podiceps podiceps ... 145
Polygonum viviparum ... 130
Polyporus ... 4
Pomolobus pseudohargengus ... 31
Pondweed, Crisp ... 126
Pooecetes gramineus ... 45
gramineus gramineus ... 174
Poplar, Balsam ... 8
Populus Tacamahaca ... 8
Porcupine ... 82, 100
Yellow-haired ... 49
Porsild, A. E.
Notes from a Labrador peat bog ... 4
Review of Mellon Carnegie Museum expedition to the Mackenzie Delta ... 84
Vascular plants collected on Kiska and Great Sitkin Islands in the Aleutians by Lt. H. R. McCarthy and Cpl. N. Kellas, August, September and October, 1943 ... 130
Porzana carolina ... 153
Potamogeton crispus L. in Alberta, by Herbert Groh ... 126
Potamogeton natans ... 126
Potentilla ... 30
fruticosa ... 5
pulchella ... 131
Sommerfeldtii ... 131
villosa ... 131
Potter, Lawrence Bedford ... 66
Preliminary report on the birds and mammals of Kootenay National Park, British Columbia, by J. A. Munro and I. McTaggart Cowan ... 34
Primula cuneifolia ssp. *saxifragifolia* ... 131
Maccalliana ... 38
Procyon lotor ... 90
Progne subis subis ... 163
Prunus emarginata ... 63
pennsylvanica ... 5
virginiana var. *demissa* ... 63
Pseudacris nigrita triseriata ... 68
Pseudotsuga taxifolia ... 63
Ptarmigan ... 116
Rock ... 116
White-tailed ... 36, 41
Putnam, W. L.
Worm-eating warbler and parasitic jaeger at Vineland Station, Ont. ... 192
Pyrola minor ... 131
secunda ... 5
Pyrotropism, A Positive, by C. H. D. Clarke ... 142

—Q—

Quercus ... 61
Garryana ... 61
Querquedula discors ... 148
Quiscalus quiscula aeneus ... 171

—R—

Rabbit ... 57
Snowshoe ... 39, 50, 88
Racey, Kenneth
Extension of range of Puget Sound spotted skunk (*Spilogale phenax olympica*) ... 104
Extension of range of the northern spotted owl (*Strix occidentalis caurina*) 104
Raccoon ... 78, 86, 88, 90
Rail, King ... 152
Virginia ... 152
Yellow ... 146, 153
Rallus elegans elegans ... 152
limicola limicola ... 152
Rand, A. L.
A Guide to bird watching, review ... 129
A northern record of the flicker and a note on the cline *Colaptes auratus* cl. *auratus-luteus* ... 183
Birds of the Alaska highway in British Columbia ... 111
English bird notes ... 68
Mallard in British Columbia (review) 81
Notes on the palm warbler, *Dendroica palmarum* (Gmelin), in Canada ... 181
Review of A list of the birds of Nipawin, Saskatchewan ... 96
Review of An analysis of mink predation upon muskrats in north central United States ... 18
Review of Experimental modification and control of moult and changes of coat color in weasels by controlled lighting ... 184
Review of Studies in the life history of the song sparrowII. The behaviour of the song sparrow and other Passeres ... 65
Review of The biotic provinces of North America ... 105
Review of The breeding distribution, history and population of the north Atlantic gannet (*Sula bassana*). Part I A history of the gannet's colonies, and the census in 1939 ... 175
Review of The sensory basis of bird navigation ... 184
Review of White spotting in the fox ... 103
The recent status of Nova Scotia fur bearers ... 85
The status of the fisher, *Martes pennanti* (Erxleben), in Canada ... 77
see also Anderson, R. M. and A. L. Rand
Rand, A. Stanley
The swamp cricket frog, *Pseudacris nigrita triseriata* (Wied) in Quebec ... 68
Rangifer arcticus ... 100
caribou ... 100

Rat, Bushy-tailed Wood 49
Raven 43, 140, 141
Northern 121, 163
Northern American 135
Recent breeding of the rough-winged swallow near Ottawa, by Harrison F. Lewis 15
Recent status of Nova Scotia fur bearers, The, by A. L. Rand 85
Redhead 149
Rediscovery of *Corallorhiza odontorhiza*, by Monroe Landon 191
Redpoll 135, 137, 140
Arctic 103
Common 135, 136, 137, 138, 139, 140, 173
Greater 173
Hoary 137, 172
Redstart, American 44, 124, 170
Red-wing, Eastern 171
Regulus calendula calendula 122
satrapa 44
olivaceus 122
satrapa 122, 165
Remarks on A. L. Rand's "English bird notes" in Vol. 58, p. 68, 1944, by R. W. Sheppard 194
Rhinanthus groenlandicus 131
Rhododendron albiflorum 38
kamtschaticum ssp. *typicum* 131
Rhyncospora alba 4
Richmondena cardinalis 84
cardinalis cardinalis 171
Riparia riparia riparia 120, 162
Robin 188, 189
American 38, 39, 40, 43, 103, 136, 138, 139
Eastern 121, 135, 164
Western 141
Role of *Sphaerospongia tessellata* in the Mackenzie River Devonian, The, by P. S. Warren 28
Rubber (milkweed) 180
Rubus 180
amicalis 180
canadensis 180
Chamaemorus 4, 5
Idaeus var. *canadensis* 5
Kennedyanus 180
Lepagei 180
quaesitus 180
russeus 180
stellatus 131
ulterior 180
Ruddy turnstone at Ottawa in 1943, by Harrison F. Lewis 23
Ruffed grouse (*Bonasa umbellus*), an extreme case of so-called "Injury-feigning by a female", by C. H. D. Clarke 194

—S—

Salix 5, 35
Barrattiana 38
candida 4, 5
crassijulis 130
Sanderling 156
Sandpiper, Baird's 118, 155
Buff-breasted 156
Common 195
Eastern Solitary 155
Least 118, 153, 155
Pectoral 155
Purple 155
Red-backed 137, 140, 156
Semipalmated 118, 153, 156
Spotted 37, 41, 117, 154, 195
Western Solitary 117
White-rumped 155
Sanson, N. B.
Clarke's nutcracker, *Nucifraga columbiana*, at Banff 182
Sapsucker, Yellow-bellied 37, 39, 40, 41, 119, 160
Sarracenia purpurea 5
Saskatchewan, records of the whooping crane (*Grus americana*), by Frank L. Farley 142
Saunders, W. E. Collection, by L. L. Snyder 192
Savile, D. B. O.
Review of Name that animal 70
Saxifraga nivalis 38
punctata ssp. *insularis* 131
rivularis 131
Sayornis phoebe 161
saya saya 119
Scirpus cespitosus 4
Sciurus hudsonicus 95, 182
Scoter, American 140, 141, 149
Surf 102, 114, 140, 149
White-winged 135, 137, 138, 139, 140, 141, 149
Scotiaptex nebulosa nebulosa 158
Screech owl in central Alberta, The, by Frank L. Farley 142
Seal, Hooded 99
Seashore parade, The review by Harold A. Senn 125
Seiurus aurocapillus 123, 170
noveboracensis noveboracensis 170
Selasphorus rufus 41
Senecio pseudoarnica 131
Senn, Harold A.
Early studies of milkweed utilization in Canada 177
Fruits of the earth, review 125
Review of Contributions to the flora and phytogeography of south-western Greenland: an enumeration of the vascular plants, with critical notes 33
Review of materials for a flora of the continental Northwest Territories of Canada 30
Review of Natural History Society of Manitoba. 21st Anniversary Bulletin, 1920 to 1941 105
Review of Notes on the Cyperaceae of Saskatchewan. II*Carex* 29
Review of Species Batorum. The genus *Rubus* in North America VII Canadenses 180
Review of The Brodie Club Proceedings No. 8 134
The Seashore parade, review 125
Sensory basis of bird navigation, The, review by A. L. Rand 184
Service berry 38
Setaria verticillata 193
Setophaga ruticilla 44, 124, 170

Sheppard, R. W.
Black-crowned night heron nesting in Lincoln County, Ontario ... 31
Remarks on A. L. Rand's "English bird notes in Vol. 58, p. 68, 1944 ... 194
Shoveller ... 114, 141, 148
Shrew, American Water ... 46
Cinereous ... 36, 38, 40
Dusky ... 36, 38, 46
Large Short-tailed ... 104
Pygmy ... 46
Shrike, Migrant ... 166
Northeastern ... 166
Northern ... 122, 137
Sialia currucoades ... 44, 122
sialis sialis ... 165
Sibbaldia procumbens ... 131
Silk-weed ... 180
Swamp ... 179
Simulium decorum katmai ... 56
Siskin, Northern Pine ... 124, 173
Pine ... 38, 39, 45, 136, 137, 141
Sitta canadensis ... 43, 121, 164
carolinensis carolinensis ... 164
Sixty-fifth annual meeting of the Ottawa Field-Naturalists' Club ... 26
Skunk ... 47, 86, 88, 92
Puget Sound Spotted ... 104
Skylark ... 195
Smelt ... 12, 84, 128, 129
Smelt situation in the upper Great Lakes, Ontario, May, 1943, The, by J. C. Stevenson ... 128
Smilacina trifolia ... 5
Snipe, Wilson's ... 117, 154
Snure, Pauline
Notice of Motion ... 141
Synder L. L.
The mute swan in Ontario ... 193
The W. E. Saunders collection ... 192
Soil erosion and land use survey, Hope Township project area, Durham County, Ont., review by M. N. Zinck ... 196
Solidago multiradiata ... 131
Solitaire, Townsend ... 39, 44, 122
Somateria spectabilis ... 149
Some aspects of Canadian birds, review by Hoyes Lloyd ... 18
Some familiar Canadian birds, review by Hoyes Lloyd ... 69
Soper, J. Dewey
Albert Burton Gresham, 1905-1941 ... 176
Laurence Bedford Potter, 1883-1943 ... 66
Notes on the large short-tailed shrew at Fort Garry, Manitoba ... 104
The Mississippi Valley pocket gopher (*Geomys bursarius* Shaw) in Manitoba ... 71
Sora ... 153
Sorbus decora var. *groenlandica* ... 5
Sorex cinereus ... 46
obscurus ... 46
palustris ... 46
Sparrow, Chipping ... 39, 45, 138, 181
Clay-coloured ... 84
Eastern Chipping ... 124, 174
Eastern Field ... 174
Eastern Fox ... 125, 174
Eastern Grasshoper ... 174
Eastern Savannah ... 135, 173
Eastern Song ... 135, 175
Eastern Tree ... 135, 174
Eastern Vesper ... 174
Eastern White-crowned ... 174
English ... 124, 135, 136, 137, 138, 139, 140, 141, 170
Field ... 138
Fox ... 39, 45, 141
Gambel's White-crowned ... 124
Golden-crowned ... 124
Grasshopper ... 84
Harris' ... 103
Henslow's ... 84
House ... 112, 124, 136, 139, 140
Lincoln ... 36, 39, 45, 125, 175
Nelson's ... 174
Rusty Song ... 141
Savannah ... 103, 124
Song ... 65, 84, 137, 138, 139, 188, 189
Swamp ... 137, 138, 175
Tree ... 103, 136, 137, 138, 139, 188
Vesper ... 45
Western Song ... 140
Western Tree ... 124
White-crowned ... 38, 39, 45, 103, 174
White-throated ... 125, 136, 137, 138
Spathoglossis ... 76
Spatula clypeata ... 114, 148
Species Batorum. The genus *Rubus* in North America VII Canadenses, review by Harold A. Senn ... 180
Sphaeriidae ... 6
Sphaerium occidentale ... 6
Sphaeronites tessellatus ... 29
Sphaerospongia tessellata ... 28, 29
Sphyrapicus varius ... 41
varius varius ... 119, 160
Spilogale phenax olympica ... 104
Spinus pinus ... 45
pinus pinus ... 124, 173
tristis tristis ... 173
Spiranthes ... 74
cernua ... 74
Romanzoffiana ... 74
Spiza americana ... 172
Spizella arborea ... 103
arborea arborea ... 174
ochracea ... 124
pallida ... 84
passerina ... 45
passerina ... 124, 174
pusilla pusilla ... 174
Spondylus upiformis ... 41
Spread of the smelt (*Osmerus mordax*) in the Canadian waters of the Great Lakes, by J. R. Dymond ... 12
Spring field excursion, Ottawa Field-Naturalists' Club, by J. A. Enstone ... 188
Squatarola squatarola ... 153
Squires, W. A.
Yellow-breasted chat in New Brunswick 24
Squirrel ... 86, 87, 95
Columbian ground ... 36, 39, 48
Flying ... 48
Golden-mantled Ground ... 36, 39, 48
Red ... 36, 38, 48, 95

Richardson's 182
Starfish 132
Starling 83, 166
Common 135, 136, 137, 138, 139, 140
European 96, 188
Statement of financial standing Ottawa Field-Naturalists' Club, December 2, 1943 25
Status of the fisher, *Martes pennanti* (Erxleben), in Canada, The, by A. L. Rand 77
Stelgidopteryx ruficollis 43
ruficollis serripennis 15, 162
Stellaria 33
calycantha 5
longifolia 5
Stercorarius parasiticus 156, 192
Sterna hirundo hirundo 157
paradisaea 102
Stevenson, J. C.
The smelt situation in the upper Great Lakes, Ontario, May, 1943 128
Sthenelides olor 193
Stone crop 189
Street, M. G.
Chimney swifts gathering twigs 24
Stringocephalus 29
burtini 28, 29
Strix occidentalis caurina 104
varia 3, 9
varia 8, 118, 158
Studies in the life history of the song sparrow II. The behaviour of the song sparrow and other Passeres, review by A. L. Rand 65
Sturnella magna magna 171
neglecta 44
Sturnus vulgaris 83
vulgaris vulgaris 166
Subscribers to the Canadian Field-Naturalist and members of the Ottawa Field-Naturalists' Club, May, 1944 106
Sugarberry 11
Sula bassana 175
Surnia ulula caparoch 158
Susceptibility of fur-bearing animals and game birds to tularaemia, The, by John H. Brown 55
Swallow, Bank 120, 162
Barn 162
Cliff 39, 43, 120
Northern Cliff 162
Rough-winged 15, 37, 39, 40, 43, 162
Tree 39, 40, 42, 120, 152, 162, 189
Violet-green 42, 120
Swamp cricket frog, *Psuedacris nigrita triseriata* (Wied), in Quebec, The, by A. Stanley Rand 68
Swan, Mute 193
Trumpeter 102
Whistling 102, 144, 147
Swift, Black 39, 41
Chimney 24, 69, 96, 152, 159, 188
Sycamore 11

—T—

Tabanus rupestris 56
septentrionalis 56
Tachycineta thalassina 42
thalassina lepida 120
Tamiasciurus hudsonicus 48
Tanager, Scarlet 171
Western 37, 38, 40, 45
Taxidea taxus 47
Teal, Blue-winged 137, 148
Green-winged 114, 140, 141, 148
Telmatodytes palustris palustris 164
Tern, Arctic 102
American Black 157
American Caspian 157
Caspian 144
Common 157
Thalictrum polygamum 5
Thlaspi 30
Thomomys 71, 72
talpoides rufescens 71
Thompson, Laura N.
Occurrence of the chimney swift at Harrington County, Quebec 69
Thrasher, Brown 164
Thrush, Alaska Hermit 122
Eastern Hermit 122, 165
Eastern Olive-backed 165
Gray-cheeked 165
Hermit 36, 38, 43, 122
Northern Varied 121
Olive-backed 35, 38, 39, 43, 122
Varied 38, 43
Wood 165
Titmouse, Great 195
Long-tailed 195
To babes really lost in the woods, by Paul L. Errington 52
Tofieldia glutinosa 38
Totanus flavipes 117, 155
melanoleucus 155
Towhee, Eastern 137, 138, 139
Oregon 140, 141
Red-eyed 173
Toxostoma rufum 164
Trientalis europaea var. *arctica* 5
Trigonia albertaensis 132
Tringa solitaria cinnamomea 117
solitaria solitaria 117, 155
Troglodytes aedon aedon 164
Trollius laxus 38
Tryngites subruficollis 156
Tularaemia 55
Turdus migratorius 43, 103
migratorius migratorius 121, 164
Turkey vulture in Ontario, north and west of Lake Superior, The, by A. E. Allin 185
Turnstone, Black 112, 117
Ruddy 23, 144, 154
Two moths from one cocoon, by Charles E. Corfe 191
Tyrannus tyrannus 119, 161
Tyto alba pratincola 158

—U—

Unique marker found on wild goose, by T. S. Hennessy 23
Uria lomvia 102

lomvia lomvia 157
Uropedilum Lindeni 76
Ursus 65
americanus 88, 98
horribilis 47
richardsoni 98

—V—

Vaccinium 35
ovalifolium 38
pennsylvanicum 4, 5
Vitis-Idaea 5
ssp. *minus* 131
Vascular plants collected on Kiska and Great Sitkin Islands in the Aleutians by Lt. H. R. McCarthy and Cpl. N. Kellas, August, September and October, 1943, by A. E. Porsild 130
Veery 165
Vermivora celata celata 123, 168
celata orestera 123
peregrina 44, 123, 168
ruficapilla ruficapilla 168
Veronica grandiflora 131
serpyllifolia 5
Stelleri 131
Viburnum 35
pauciflorum 5
Viola palustris 5
Langsdorffii 131
Vireo flavifrons 167
gilvus 44
gilvus 167
swainsoni 122
olivaceus 44, 167
olivaceus 122
philadelphicus 167
solitarius 44, 167
Vireo, Blue-headed 167
Eastern Warbling 167
Philadelphia 167
Red-eyed 37, 44, 122, 167
Solitary 44
Warbling 39, 44, 122
Yellow-throated 167
Vole, Lemming 36, 38, 46
Long-tailed 36, 38, 49
Meadow 36, 37, 38, 45, 49
Red-backed 9, 49
Richardson 36, 38, 46
Vulpes alascensis 47
fulva 92, 99
Vulture, Turkey 83, 185

—W—

Walrus 99
Wapiti 37, 38, 39, 46, 50
Warbler, Audubon 38, 40, 44
Bay-breasted 112, 123, 169
Black and White 167
Blackburnian 169
Black-poll 123, 169, 181
Black-throated Blue 168
Black-throated Green 169
Canada 170
Cape May 168
Cerulean 169
Chestnut-sided 169
Common Orange-crowned 168
Eastern Nashville 168
Eastern Orange-crowned 123
Eastern Yellow 168
Macgillivray 39, 44, 112, 123
Magnolia 123, 168
Mourning 170
Myrtle 123, 168, 181, 182
Northern Black-capped 123
Northern Parula 168
Northern Pine 169
Northern Yellow 123
Palm 112, 181
Pileolated 123
Tennesee 36, 38, 39, 40, 44, 123, 168
Townsend 39, 44
Western Palm 123, 181, 182
Wilson 39, 44, 170
Worm-eating 192
Yellow 188
Yellow Palm 169, 181
Warren, P. S.
The role of *Sphaerospongia tesselata* in the Mackenzie River Devonian 28
Water-thrush, Northern 170
Waxwing, Bohemian 36, 40, 44, 122, 140, 166
Cedar 136, 138, 166
Weasel 37, 58, 86, 88, 184
Long-tailed 184
Mountain 47
Short-tailed 47, 91, 184
W. E. Saunders collection, The, by L. L. Snyder 192
Whale, Bow-head 102
White 84, 102
Whip-poor-will, Eastern 159
White spotting in the fox, review by A. L. Rand 103
Widgeon, European 148
Wild cat 78, 86, 87, 94, 95
Willet, Western 144, 155
William Pollock Fraser, 1867-1943, by J. H. Craigie 1
Wilsonia canadensis 170
pusilla 44, 170
pileolata 123
Wolf 78, 87, 99
Timber 47
Wolverine 36, 47, 78, 99
Woodcock, American 154
Woodlark 195
Woodpecker, Alaska Three-toed 119
American Three-toed 38, 40, 96
Arctic Three-toed 42, 119, 135, 140, 161
Downy 136, 137, 138, 139, 140
Eastern American Three-toed 161
Eastern Hairy 160
Gairdner's 140, 141
Hairy 37, 39, 40, 41, 135, 136, 137, 138, 139, 140
Lewis's 96
Nelson's Downy 119
Northern Downy 135, 160
Northern Hairy 119, 135
Northern Pileated 160

Pileated 41, 119, 137, 138, 139, 140, 141
Red-headed 83, 160
Three-toed 40, 42
Worm-eating warbler and parasitic jaeger at Vineland Station, Ont., by Wm. L. Putnam 192
Wren, Eastern House 164
Eastern Marsh 164
Eastern Winter 164
Long-billed Marsh 138
Seattle 141
Short-billed Marsh 83, 164
Western Winter 141
Winter 35, 43, 138, 140

—X—

Xema sabini 157

—Y—

Yellow-breasted chat in New Brunswick, by W. A. Squires 24
Yellow-legs, Greater 155
Lesser 117, 155
Yellow-throat 37, 38, 44
Maryland 138
Northern 170
Western Maryland 123

—Z—

Zaphrentis recta 28
Zapus princeps 46, 49
Zenaidura macroura 64
macroura carolinensis 157
Zinck, M. N.
Review of Soil erosion and land use Survey, Hope Township project area, Durham County, Ont. 196
Zonotrichia albicollis 125, 174
coronata 124
leucaphrys 45, 103
gambeli 124
leucophrys 174
querula 103

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